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THE MALE OF *COTYLOSOMA DIPNEUSTICUM* WOOD-MASON, 1878 (PHASMIDA : PHYLLIIDAE).

By D. R. Ragge, Ph.D., F.R.E.S.

(*British Museum (Natural History)*).

The Fijian genus *Cotylosoma* Wood-Mason, 1878, has aroused great interest in the past on account of the curious gill-like appendages of the metathorax. For many years it was inferred from these structures that the genus was semi-aquatic in its habits and capable of both aerial and aquatic respiration. In 1935, however, Uvarov exploded this myth on the basis of a report on the habits of *Cotylosoma dipneusticum* Wood-Mason ; he also drew attention to the unsuitability of the metathoracic organs for aquatic respiration. The function of these structures is still unknown and it is to be hoped that studies on living material will soon solve the problem.

When Wood-Mason first described *Cotylosoma dipneusticum* in 1878 he gave its origin as Borneo ; Waterhouse (1895) later corrected this to Taveuni, Fiji, and supplemented Wood-Mason's very brief description with a figure. Redtenbacher (1906–8) considered *Cotylosoma* Wood-Mason to be a synonym of *Nisyrus* Stål, 1877, but Uvarov (1935) has pointed out that the two genera are sufficiently distinct. The latter author (*op. cit.*) lists the following species as belonging to *Cotylosoma* Wood-Mason : *C. dipneusticum* Wood-Mason (Fiji), *C. amphibius* (Stål, 1877) (Tonga, Fiji ?), *C. godeffroyi* (Redtenbacher, 1908) (Tonga), and *C. carlottae* (McGillivray, 1860) (New Hebrides, Fiji ?).

No male specimen of any of these species has hitherto been found, and I am indebted to Mr. H. W. Simmonds for sending the specimen on which this description is based. The insect flew on to Mr. Simmonds' hat while he was at the top of the mountain Lomailangi (3700 ft.), Viti Levu, Fiji Islands. A description of this male is given below together with a redescription of the female sex.

Cotylosoma dipneusticum Wood-Mason. (Plate I.)

Male.—Head without spines or tubercles. Vertex with median depression ; otherwise slightly convex with median longitudinal groove and two further lateral grooves on each side towards posterior end. Interocular space twice width of eye. Ocelli absent. Antennae almost as long as fore legs.

Pronotum with few small tubercles. Mesonotum and mesopleura tuberculate. Metapleura with few small tubercles and each bearing ventrally five articulate lanceolate plates, profusely hairy round edges. Fore femora with 6 ventrolateral lobes and serrate dorsal ridge ; fore tibiae with 3 ventrolateral lobes ; fore metatarsi with one ventrolateral lobe. Mid femora with 5–6 ventrolateral lobes and serrate dorsal ridge ; mid tibiae with 3 ventrolateral lobes ; mid metatarsi with one small ventrolateral lobe. Hind femora with 6 ventrolateral lobes and slightly serrate dorsal ridge ; hind tibiae with 4–5 ventrolateral lobes ; hind metatarsi with one small ventrolateral lobe. Fore wings rudimentary, one-

fifth of length of hind wings. Hind wings well-developed ; R branching 3·9 mm., M 2·8 mm., from base of wing ; Cu and 1A very poorly developed (terminology of Ragge, 1955).

Abdomen depressed ; segments 1–4 with lateral flanges, produced slightly at posterior end ; segments 5–9 with large, backwardly directed, lateral lobes. Cerci extremely small.

General colour mottled olive-brown above, even pale brown below. Anal fan of hind wing hyaline.

Female (*redescription*).—As male except in following respects. Vertex strongly convex posteriorly ; its median depression more marked and tending to be double. Interocular space more than three times width of eye.

Pronotum with few spines. Mesonotum with numerous large spines. Meso- and metapleura with few spines. Fore femora with about 10 ventrolateral lobes. Mid femora with about 6 ventrolateral lobes ; mid tibiae with about 5 ventrolateral lobes. Hind femora with about 8 ventrolateral lobes ; hind tibiae with about 5 ventrolateral lobes. Fore and hind wings both reduced to rudimentary flaps of equal length.

First two abdominal segments with lateral flanges, produced slightly at posterior end ; segments 3–9 with large, backwardly directed, lateral lobes. Cerci as large as lateral lobes of ninth abdominal segment, slightly spatulate and pointed at tip.

Measurements.—All measurements are given in millimetres ; in the case of the female they refer to the holotype.

	Male.	Female.
Total length . . .	47	95
Length of pronotum .	3·3	7·1
Length of mesonotum	6·1	16·0
Length of fore femur .	10·7	20·5
Length of fore wing .	5·7	9·8
Length of hind wing .	27·3	

References.

Brunner von Wattenwyl, C., and Redtenbacher, J. 1906–1908, *Die Insektenfamilie der Phasmiden.* Leipzig (Engelmann).

McGillivray, J., 1860, Description of *Prisopus carlottae*, a new species of leaf insect. *Zoologist* **18** : 7141–7142.

Ragge, D. R., 1955, The wing-venation of the order Phasmida. *Trans. R. ent. Soc. Lond.* **106** : 375–392.

Redtenbacher, J., 1906–1908, *see* Brunner von Wattenwyl, C., and Redtenbacher, J. 1906–1908.

Stål, D., 1877, Espèces nouvelles de Phasmides. *C.R. Soc. ent. Belge* **20** : lxii–lxviii.

Uvarov, B. P., 1935, The myth of semiaquatic phasmids. *Z. Morph. Ökol. Tiere* **30** (3) : 432–437.

Waterhouse, C. O., 1895, Observations on the supposed semiaquatic Phasmid, *Cotylosoma dipneusticum*, W.-M. *Ann. Mag. nat. Hist.* (6) **15** : 498–499.

Wood-Mason, J., 1878, Preliminary notice of a species of Phasmidae apparently possessing all the structural arrangements needed both for aerial and aquatic respiration. *Ann. Mag. nat. Hist.* (5) **1** : 101–102.

Cotylosoma dipneusticum Wood-Mason, male (left) and female. Natural size.

D. R. Ragge. *Adlard & Son, Ltd., Dorking.*

UNDESCRIBED CULICINE LARVAE AND PUPAE FROM UGANDA.

By Mrs. E. C. C. van Someren.

(*Division of Insect-Borne Diseases, Medical Research Laboratory, Nairobi, Kenya.*)

The setal nomenclature used in the following descriptions of pupae is that of Knight and Chamberlain (1948).

Theobaldia (*Theomyia*) *fraseri* Edwards.

Pupa.

Dorsum of thorax and first six abdominal segments dark brown, with the trumpets darker, the rest of the integument dark yellow and the paddles transparent. *Thorax:* Trumpets very dark brown, short and with a large oblique opening. Hairs 1 and 7 very long and usually 2-branched (7 occasionally 3-branched), all other hairs about one-third the length of 7, except 8, which is nearly half the length of 7; hairs 2, 3, 8 and 9 often

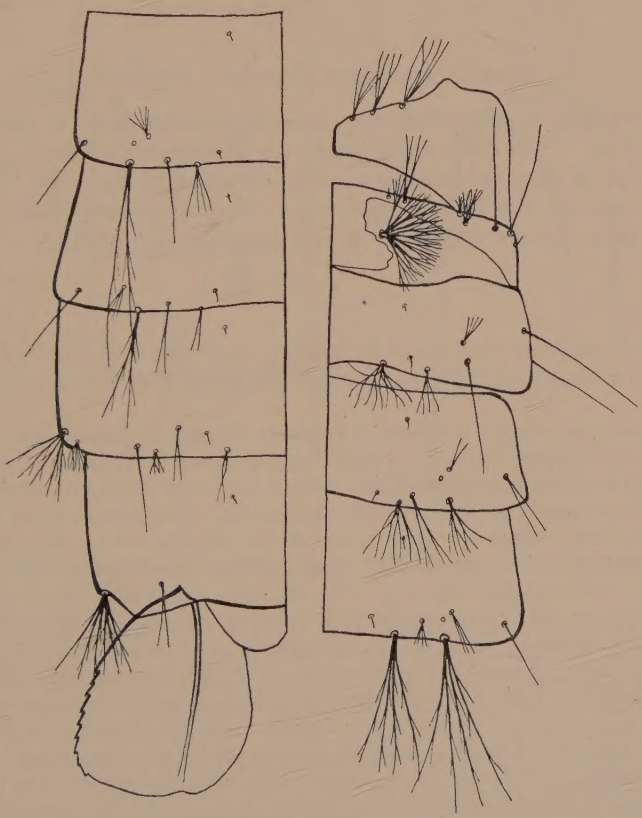


Fig. 1.—*Theobaldia* (*Theomyia*) *fraseri* Edwards. Pupal tergites.

single but may be bifid and hairs 4, 5 and 6 are usually bifid (hair 5 sometimes having each branch divided again apically). Hairs 10–12 short and subequal, hair 10 with 4–7 branches and 11 and 12 2–5 branched with the branches sometimes split again apically.

Abdomen : Tergites as figured (fig. 1), with all the hairs appearing simple under low powers of the microscope, but the longer hairs are finely plumose when seen under high powers. There is a slight variation in the number of branches of the tufts and the branches may be divided again apically. Hairs 2 and 4 on segments VI and VII as well as hair 5 on the eighth segment may be bifid or single and hair 8 on segments VII and VIII has 5–7 and 6–8 branches respectively. *Sternites :* Hair 8 on segments III–VI a small hair-like spine ; hair 9 is very short on segments III–VI, dendritic on III and bifid or trifid on the other segments ; on segment VII it is about four times the length of this hair on the other segments and has about 13 branches, which are finely plumose under high powers of microscope. Hair 10 is single or bifid on the second segment, very short and with 2–3 branches on third and fourth segments, slightly longer and with 4–6 branches on the fifth segment and single and long on segments VI–VII. Hair 11 is much longer than the others and single, except on the eighth segment, where it is split into 2–3 branches beyond a half. Hair 12 is a single, very short seta, except on segment VII where it is bifid. The paddles have no terminal seta.

Described from the paedotype with associated adult and 3 other pelts from tree holes, Entebbe, Uganda.

Aedes (*Aedimorphus*) *leptolabis* Edwards.

Hopkins (1952) reports that the larva of this mosquito is not known for certain but that " those from forest pools are not separable from *A. domesticus*." Bred material of this species was recently obtained at Entebbe, Uganda, and the early stages are now known for certain. The larva shows small but distinct differences from that described for *A.* (*A*) *domesticus* Theobald.

Larva.

Distinguished from *domesticus* by having head seta *d* in front of C, the subventral tuft at half and the upper caudal seta with about 10 branches.

Head : Antennae curved, infuscate throughout, strongly spiculate and with a tuft of about 6 plumose branches just below a half. Setae A, B and C obviously plumose and with 12–13, 6–8 and 8–10 branches respectively ; *d* small, in front of C and with about 6 branches ; *e* and *f* small and usually 3-branched. The mentum has 17–18 narrow teeth on either side of the central tooth. *Abdomen :* Comb a row of 4–5 (usually 4) long, curved, dark, sharp pointed spines, each with a narrow basal fringe of short fine denticles. Siphon bilaterally convex at the middle, sharply tapering to tip and with an index of about $4\frac{1}{2}$–$5\frac{1}{2}$ (4·4–5·6, whole uncrushed larvae). Pecten not reaching to a half and composed of 12–16 dark spines, none of which is noticeably wider spaced and with the distal spines long and curved ; each spine with one large ventral denticle and usually 1 or 2 smaller denticles below. The subventral tuft at a half is short, fine and with 4–7 simple branches. The anal segment has a large saddle which is interrupted narrowly below and the saddle hair is about half its length, fine and with 2–3 branches or single ; upper caudal seta with 9–13 short, equal branches, and the lower is single. The ventral brush consists of 4 tufts of many-branched setae in the barred area and 4 unpaired setae outside. " Gills " long, narrow and sharply pointed with the upper pair about three and a half times the length of the saddle and the lower pair about three quarters the length of the upper.

Pupa.

The pupa is similar to that of *A.* (*A.*) *hopkinsi* Edwards described by Edwards (1941), but may possibly be distinguished on the character of hair 8 on the eighth segment which, in this species, is about one-quarter the length of the paddles and single or split at the tip. Only three pupal pelts have been examined so this character may prove to be variable.

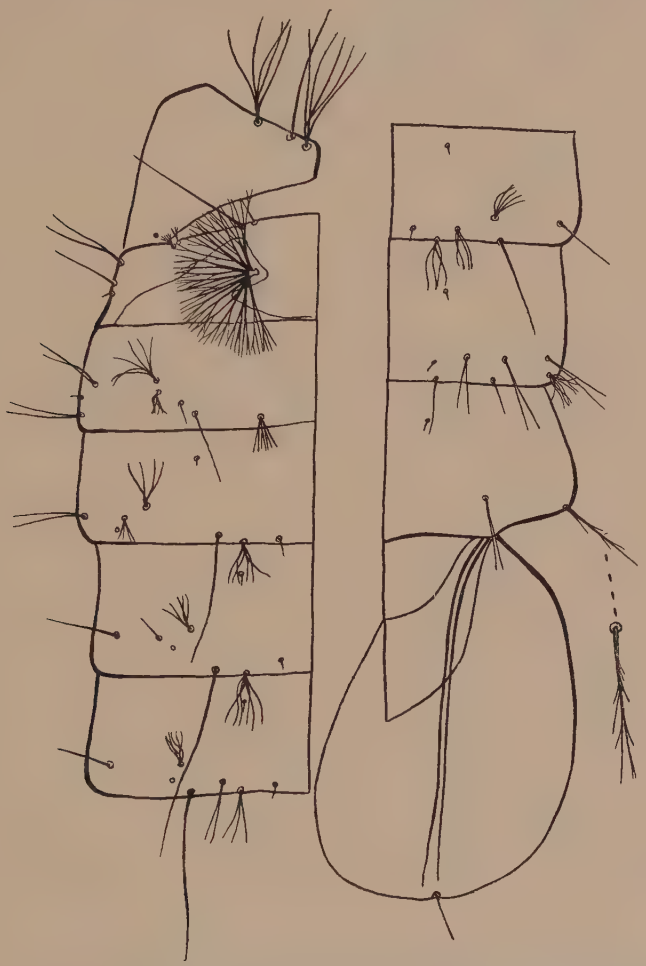


FIG. 2.—*Aedes* (*Aedimorphus*) *leptolabis* Edwards. Pupal tergites.

Thorax : Trumpets short (length about three times the greatest width) dark, almost cylindrical and with the opening small and not very oblique. Hairs all rather short and fine with 1 and 2 usually 3-branched, 3 bifid, 4, 5 and 7 with 3–5 branches and 6 usually single but may be bifid. Hairs 8 and 9 shorter than the trumpets and with 2–3 branches, which are usually split again apically. Hairs 10 and 12 with 4–6 branches and hair 11 is single, and all are about the same length. *Abdomen :* Tergites as figured (fig. 2) with hair 7 single or with up to 3 branches, hair 6 with 4–9 branches except on segment VII where it is longer and single or with up to 3 branches. Hair 5 with 4–5 branches on segments II–III and single or bifid on segments IV–VII and hair 4 on segments VI–VII with 2–5 branches.

Hair 2 with about 7–12 branches on segment II, 5–6 branches on III–IV and 2–4 branches on the other segments. Hair 8 is short and single and fine on all segments except on segment VII, where it is a short tuft of 7–8 branches and on the eighth segment it is a stoutish hair, about a quarter the length of the paddles and simple or very sparsely and finely plumose and it may be split again apically. *Sternites :* Hairs 9 and 10 short and 2–4 branched, except on segments VI–VII, where 10 is longer and single. Hair 12 internal to 11 on segments III–V and external on VI–VII, short and spine like except on VII, where it is a longer hair. Hair 11 longer than the others and single or with up to 3 branches. The paddles are pale with very few fine spicules on the outer edge.

Described from the paedotype, 1 other larvae and 2 pupal pelts with associated adults and 16 whole larvae. The larvae were taken from ground pools at Zika, Entebbe, Uganda.

Culex (*Neoculex*) *insignis* Carter.

Larva.

Hopkins (1952) says " the larva is partly described by MacGregor (1927, p. 175) fig. 42 under the name *rima* but the characters he gives will not distinguish it from *sunyanensis* ". The larva of *insignis* described below is very like that of *C.* (*N.*) *sunyanensis* Edwards and no very definite distinguishing characters were found, but the one pelt available for study differs from *sunyanensis* as follows :

Head seta *d* bifid beyond the middle and the comb has about 50 scales only (the distal scales being markedly longer than the proximal ones.) The pecten has fewer teeth, 8 on one side and 9 on the other, the saddle is covered with rows of minute spicules and with 1 or 2 spines on the distal edge with the seta 4-branched and about a quarter the length of the saddle.

In addition the mentum is very like that figured by Hopkins (1952) for *C.* (*N*) *wigglesworthi* Edwards, having 4 short teeth on either side of the large central tooth followed by large teeth and a minute tooth below. The antennae and head setae A and B are missing, but seta C is plumose and 2-branched and *e* and *f* are short tufts of 7–9 branches. The siphon is pale brown and sharply tapered to about one-third, after which the sides are parallel to just before the tip, where they are slightly divergent and the index is 8 in the mounted pelt. The pecten teeth have 4–6 fairly evenly spaced ventral denticles of about the same size which reach to near the tip. There seems to be about 6 pairs of subventral tufts all very short, simple and bifid, except the last which is single ; the first tuft is placed well beyond the pecten (just below a third) and the last is near the tip. The upper caudal seta is 4-branched with 1 long and 3 short branches and the lower is single. The ventral brush has 6 pairs of many branched setae in the barred area and one unpaired seta outside. The " gills " are missing.

Pupa.

Thorax : with none of the hairs very long ; hair 3 single, hairs 1, 4, 6, 8 and 9 bifid and hair 5 is 4-branched and 7 trifid. Hairs 10–12 are all about the same length and not very long and as illustrated (fig. 3), but hair 12 is trifid on the other side of the specimen examined. *Abdomen :* Tergites as figured (fig. 3) with hair 2 on the second segment having 10–15 branches. On the other side of the specimen figured hair 2 on segment III has 8 branches, hair 5 has 2 and hair 6 6 branches on segments VI and V respectively ; hair 4 is bifid on segment V–VI, hair 7 is bifid and hair 2 is 4-branched on VI. *Sternites :* Hairs arranged as usual for *Culex* with 9 short and 2–3-branched ; 10 with 3–6 branches and small except on

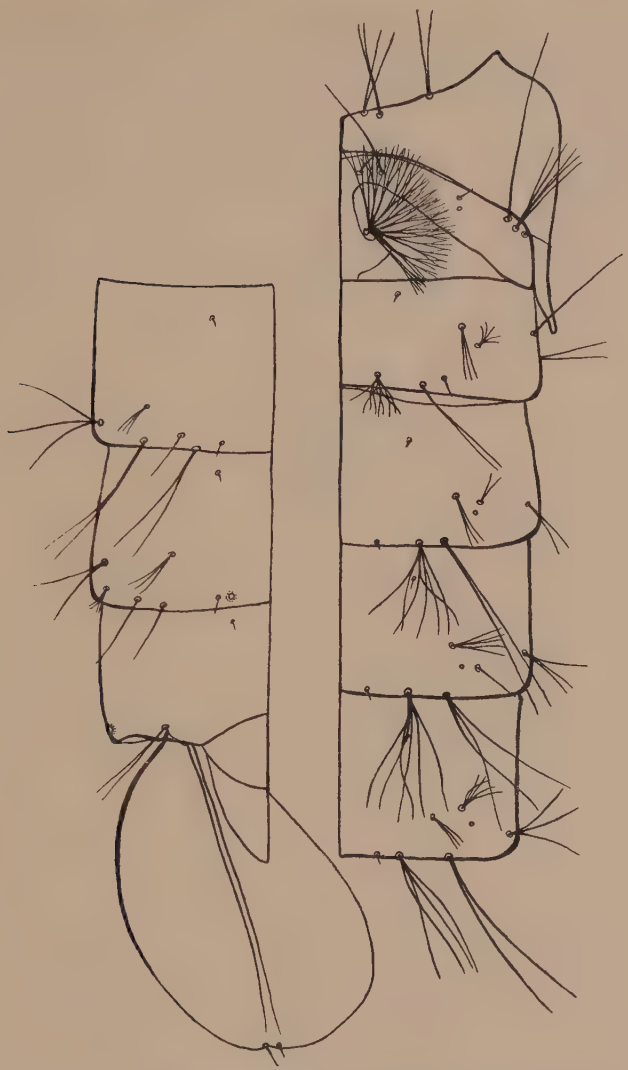


FIG. 3.—*Culex* (*Neoculex*) *insignis* Carter. Pupal tergites.

segments VI–VII, where it is longer and single ; 12 is short and single or bifid and 11 is long and single or bifid.

Described from the paedotype with associated adult male. The larva was taken from a swamp at Musoli, Entebbe, Uganda.

Culex (*Culiciomyia*) *semibrunneus* Edwards.

Larva.

This larva runs down to the first section of couplet 63 in the key given by Hopkins (1952) for the genus *Culex* and may be differentiated from *C. decens*

Theobald and *C. individiosus* Theobald by having the lower and upper caudal setae single. Of the known *Culiciomyia* larvae it most closely resembles *C. cinerellus* Edwards but differs by having 4 or 5 ventral denticles to the pecten teeth.

Head : The antennae are curved and obviously spiculate below the tuft (except for the inner edge which is smooth), they are infuscate for the full length and the tuft of 24–29 plumose branches is at about three-quarters. Setae A, B and C are about the length of the head and with 5–8, 2 and 2–3 (usually 3) plumose branches respectively ; *d* is short, fine and single and *e* and *f* have 2–3 and about 8 branches respectively. The mentum has 8–10 teeth on either side of the central tooth and the basal 3 are rather larger than the rest. *Abdomen* (fig. 4) : Comb a patch of 27–36 narrow scales. Siphon pale brown and with an

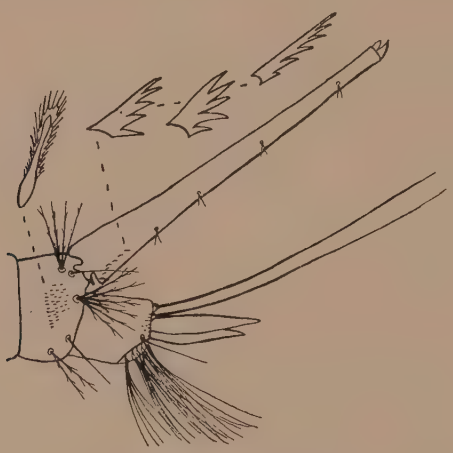


Fig. 4.—*Culex* (*Culiciomyia*) *semibrunneus* Edwards. Larva.

index of about 11½–13½ in whole unmounted larvae and about 8 in mounted pelts ; the pecten has 8–12 teeth reaching to about one-sixth and each tooth has 4–5 rather large denticles evenly spaced along the ventral side (the apical denticle being almost or quite as long as the tip, which makes the spine appear to have a bifid tip) ; the 4 subventral tufts are shorter than the diameter of the siphon, simple and usually 2-branched but may be single. The saddle is large and complete, with a patch of small spines about the middle of the distal edge, and the seta is single, simple and not much shorter than the length of the saddle ; both upper and lower caudal setae are single and the ventral brush has 5 pairs of many branched setae. The " gills " are pointed with the lower pair slightly shorter than the upper, which are about one and a half times the length of the saddle.

Pupa.

Trumpets dark throughout, cylindrical, though slightly constricted beyond a half, long and narrow (the length is from 8–12 times the greatest breadth in mounted skins). The opening is not very oblique and is short, and in the middle of the lower edge there is a short slit ; the tracheiod area reaches to a half. *Thorax :* None of the hairs very long and all, except 6, are about the same length as 8, which is about half the length of the trumpets ; 6 is very much shorter. Hairs 1, 2 and 5 have from 3–5 branches, hair 3 can have up to 3 branches and hairs 4, 7 and 9 may be single or bifid. Hair 8 is bifid and 6 is usually

bifid but may be 3-branched. *Abdomen :* Tergites as figured (fig. 5) with the addition of a median dorsal patch of small spines on segments I–III which are distinct on I and II but fine on III. The shorter hairs 5 and 6 vary a little in the number of branches and either may have up to 6 branches on one of the segments. Hair 10 on the first segment may be single and hair 7 may be single or trifid, but is more usually bifid. Hair 8 is sometimes single on the

FIG. 5.—*Culex* (*Culiciomyia*) *semibrunneus* Edwards. Pupal tergites.

first segment with 4–6 branches on the eighth and, although usually trifid, may have 2–4 branches on the seventh segment. Hair 2 has from 3–8 branches (usually 4) and hair 4 on the sixth segment has 2–4 branches (usually 2). *Sternites :* Hairs arranged as usual for *Culex* with hair 9 small and usually bifid but sometimes trifid, hair 10 small with 3–6 branches except on segments VI–VII where it is long and single, hair II usually single but can be bifid and hair 12 short and spine-like except on the seventh segment where it can be a short, bifid seta. The paddles are pale and transparent and with a smooth distal edge and there is a minute terminal seta and a smaller accessory hair.

Described from the paedotype and 19 other pelts with associated adults and a few whole larvae. The material was collected at Zika near Entebbe, Uganda, from a swamp.

Note.—The terminalia of the male imagos associated with the pelts differ from the description of the terminalia of *C. semibrunneus* given by Edwards (1941) in that they have a very short but quite distinct basal arm to the paraprocts. The vestiture of the male palps, though, determines them as this species, the distal outstanding scales being round tipped.

Culex (*Culex*) *quasiguiarti* Theobald.

The early stages of this mosquito are very like those of *C. univittatus* Theobald and no definite distinguishing character has been found to separate the larvae of these two species. According to Hopkins (1952) the saddle is smooth in *univittatus* but this is not always the case and larval pelts from Nairobi and Mombasa have the saddle covered with fine spines.

Larva.

Head : Antennae curved, spiculate on the outside below the tuft and pale with a dark band at the base and infuscate beyond the tuft, which is at about three-quarters and consists of 20–25 plumose branches. Setae A, B and C have 7–9, 2 and 3 plumose branches respectively : *d* is single and *e* and *f* have 5–6 and 8–9 branches and all are small and fine. The mentum has 7 large teeth on either side with one very small, wider spaced tooth at the base. *Abdomen :* The comb is a patch of about 50 finely-fringed scales. The siphon is pale brown, with an index of about 7 (mounted skins) and there are 11–13 pecten teeth with the last 1 or 2 spines tending to be more widely separate and each spine has 3–5 (usually 4–5) ventral denticles ; the 3 sub-ventral tufts are simple, much shorter than the diameter of the siphon and with 2–4 branches and there are 2 similar lateral tufts. The saddle is large and complete with a patch of small, fine spines on the distal edge and the saddle hair has 3–4 branches ; the upper caudal seta has 1 long and 1 short branch and the lower is single ; the ventral brush consists of 6 pairs of many-branched tufts. The " gills " are missing.

Pupa.

Similar to that of *C. univittatus* as described and figured by Kirkpatrick (1925) and when compared with pupal pelts of *univittatus* no diagnostic difference was found.

Described from the paedotype with associated adult male and one other slide with associated adult male. Three other mounts of larval and pupal skins with associated female adults do not differ from the above description and the females appear to be this species. The larvae were all taken from a swamp at Kitinda, Entebbe, Uganda.

Note.—In addition to *C. univittatus*, there are three other larvae with which this species might be confused. They are *C. antennatus* Becker, *C. decens* Theobald and *C. invidiosus* Theobald and, in fact, it is extremely difficult to separate with certainty any of these five larvae and that of *C. trifoliatus* Edwards described below. It appears, on the evidence of a small series of bred material of each species, that it is not possible to separate *C. univittatus*, *quasiguiarti*

and *trifoliatus*, but *antennatus* can be distinguished from all by having a shorter siphon and the pecten teeth have fewer and larger denticles. *C. decens* may possibly be separated from the rest by having the saddle hair with fewer branches (1–2 as against 2–4) and by having a longer siphon (index of mounted skins over 9). The series of 16 *invidiosus* pelts cannot be separated from *univittatus*, as they have a consistently shorter siphon than *decens* (index about 8 uncrushed and 6 crushed) and the saddle hair and head seta C are often 3-branched.

In Hopkins' (1952) key to the *Culex*, *C. zombaensis* Theobald runs down to couplet 65 and is distinguished from *univittatus* in this couplet by having a spiculate saddle. As has been pointed out above and by Mattingly (1953), this is an unreliable character. The *zombaensis* material I have examined consists of a few pelts with associated adults, and many whole larvae which agree with these pelts, and the character of the pecten spines will immediately distinguish this species from *univittatus*. In *zombaensis* the pecten spines are strongly curved (the distal spine in particular appearing very like a lion's claw) and the denticles are small and grouped at the base of the spine. In addition the comb teeth of *zombaensis* have a coarser fringe than shown by the scales of the comb of *univittatus* and it is sometimes not easy to decide whether they are spines or scales. In fact, it would be possible to run this larva down from couplet 20 of Hopkins' key to *C. theileri* Theobald, which *zombaensis* closely resembles, especially in the character of the pecten spines. It can, however, be separated from *theileri* by having short and inconspicuous subventral tufts on the siphon.

Culex (*Culex*) *trifoliatus* Edwards.

Larva.

This larva is very like that of *C.* (*C.*) *univittatus* Theobald.

Head : Antennae curved and pale but darkened at base and beyond the tuft, which is at about two-thirds, and with 24 plumose branches on one side and 19 on the other. Setae A, B and C plumose and with 6, 2 and 2 branches respectively ; *d* single and *e* and *f* with 4 and 6 branches respectively. Mentum with 7 teeth on either side. *Abdomen :* Comb a patch of about 30 scales. Siphon pale and with an index of about 7 in the mounted pelt and the pecten consists of 13 pale teeth, each having 3–4 denticles (the basal spines have 3 denticles and the more distal have 4). There are 3 subventral tufts, composed of 3 simple branches, which are shorter than the diameter of the siphon. The saddle is pale and complete and with a group of minute spines on the upper distal corner. The saddle seta and the upper caudal seta are missing but the lower caudal seta is single. The ventral brush consists of 6 pairs of many-branched setae and the " gills " appear pointed and about the length of the saddle.

Described from the paedotype with associated adult. The larva was taken from a ground pool at Sissa, near Entebbe, Uganda.

The paedotypes of the mosquitoes described in this paper will be deposited in the British Museum (Natural History), London.

Acknowledgements.

All the material described here was collected while on a visit to the Virus Research Institute, Entebbe, Uganda.

References.

Edwards, F. W., 1941, *Mosquitoes of the Ethiopian Region*, **3**. London, Brit. Mus. (Nat. Hist.).

Hopkins, G. H. E., 1952, *Mosquitoes of the Ethiopian Region*, **2**. 2nd edition. London, Brit. Mus. (Nat. Hist.).

Kirkpatrick, T. W., 1925, *The mosquitoes of Egypt*. Cairo, Govt. Press.

Knight, K. L. and Chamberlain, R. W., 1948, A new nomenclature for the chaetotaxy of the mosquito pupa, based on a comparative study of the genera (Diptera : Culicidae). *Proc. helminth. Soc. Wash.* **15** : 1–10.

Mattingly, P. F., 1953, Notes on the Culicini of the Katanga (Diptera, Culicidae). 1. Taxonomy. *Rev. Zool. Bot. afr.* **47** : 311–343.

A NEW GENUS AND SPECIES OF TACHYPORINAE FROM AUSTRALIA (COLEOPTERA: STAPHYLINIDAE).

By W. O. Steel, F.R.E.S.

The genus described below is closest to *Tachinomorphus* Kraatz. It differs, however, in the structure of the mouthparts, particularly the ligula, which is very well developed and different from that of any other described Tachyporine genus, the more convex form, the longer elytra which are somewhat narrowed posteriorly with the apex lightly rounded instead of sharply truncate, the somewhat broader paratergites, the absence of long setae at the sides of the fourth to sixth abdominal segments, the longer posterior tibiae and the differently formed tarsi. From *Tachinus* Gravenhorst it differs, apart from the structure of the mouthparts and the greater convexity, in the keeled mesosternum, the narrower paratergites, the somewhat longer, posteriorly narrowed elytra, the longer, distinctly less spinose tibiae and the structure of the tarsi.

It may be mentioned here that the Australian *Tachinus novitius* Blackburn is not a true *Tachinus* and probably represents another new genus.

Austrotachinus gen. n.

Labrum transverse, membranous in front towards sides, anterior margin slightly emarginate and with a fringe of close-set fine setae which become gradually longer towards the sides. Mandibles stout, without teeth internally, prostheca and molar area well developed. Inner lobe of maxilla moderately broad, fringed internally with close-set, relatively stout setae which become gradually finer and shorter posteriorly, the outer about as broad as the inner, closely set with much longer, finer setae apically and externally. Maxillary palpi long, the first segment very short, transverse, the second long, lightly curved, a little widened apically, the third much shorter than the second, distinctly longer than broad, slightly widened apically, the fourth much longer, almost as long as the second, bluntly pointed apically. Ligula (fig. 2) very large, the glossae distinct, rounded in front and closely setose apically, the paraglossae considerably larger than the glossae, more or less hatchet-shaped and extending almost to the apex of the labial palpi, densely setose. Lobes of the hypopharynx well developed, long, extending nearly as far as the apex of the paraglossae, densely setose internally. Labial palpi long, the first segment long, slightly widened apically, the second shorter than the first but distinctly longer than broad, slightly widened apically, the third about as long as the second, bluntly pointed.

Mesosternum with a distinct longitudinal median keel.

Elytra comparatively long, slightly narrowed posteriorly.

Paratergites of abdomen narrow but distinct. Third to sixth abdominal segments without long setae at the sides.

Legs moderately long. All the femora with distinct short spines internally at apex. Anterior tibiae scarcely widened apically, with four or five spines externally, the intermediate with a few stout spines, the posterior also with a few spines, mainly on the apical half; all the tibiae also with numerous short fine setae. Anterior tarsi about three-fifths as long as the tibiae, the first four segments about equal in length, the fifth not as long as the preceding two together; the first four segments dilated in the male. Intermediate tarsi about half as long as the tibiae, the first segment rather long, about twice as long as the second, the second to fourth about equal in length, the fifth almost as long as the

preceding two together. The posterior about half as long as the tibiae, the first segment long, the second shorter, about two-thirds as long as the first, the third and fourth about equal in length, almost two-thirds as long as the second, the fifth practically as long as the preceding two together.

In other respects similar to *Tachinus* Grav.

Type species : *Austrotachinus fuscipes* sp. n.

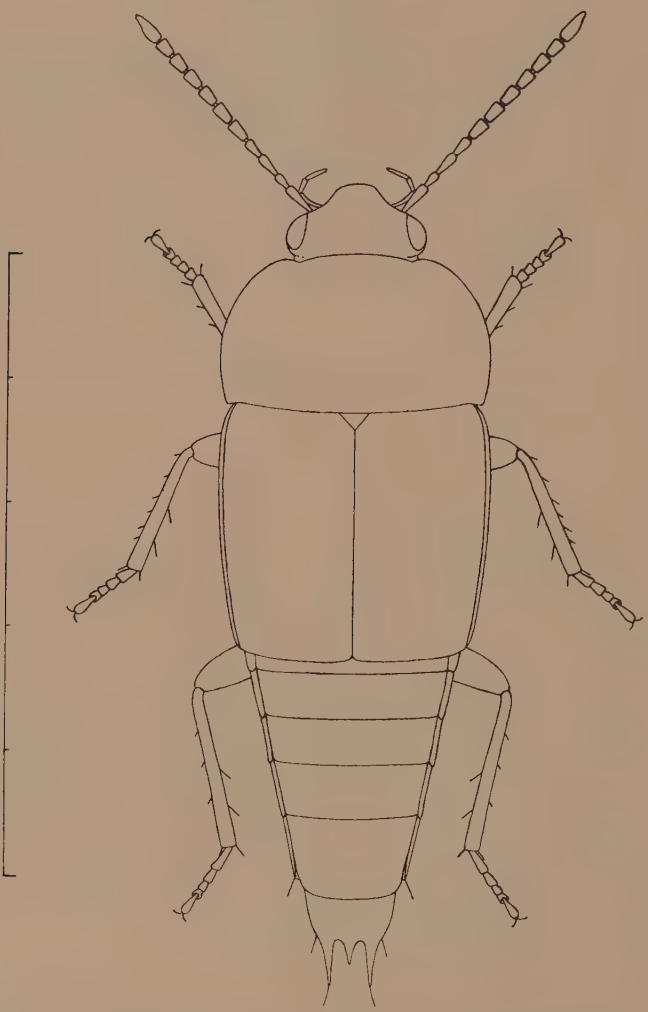


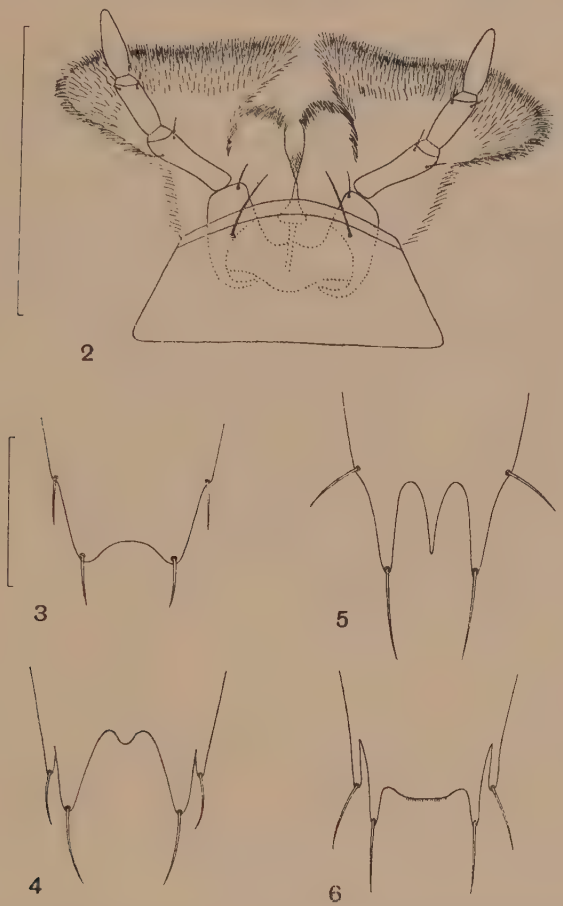
Fig. 1.—*Austrotachinus fuscipes* sp. n., female. (Scale = 5 mm.).

Austrotachinus fuscipes sp. n. (Figs. 1–6.)

Somewhat convex, head and pronotum rather shining, the abdomen a little duller. Head, pronotum and abdomen very dark brown to brownish-black, anterior portion of head and sides of pronotum brownish, tergites of abdomen narrowly brownish, elytra black. Antennae with the first two and last two (and sometimes also the third and fourth)

segments light yellowish-brown, the rest darker brown. Palpi yellowish, mandibles yellowish-brown. Legs dark brown, the tarsi light yellowish-brown.

Head transverse, impressed on each side behind the base of the antenna ; surface with sparse, minute punctures and, except on disc, a superficial vermiculate ground sculpture which is distinctly stronger on the neck. Antennae moderately long, reaching (if extended backwards) to apex of anterior fourth of the elytra, the third segment distinctly longer



FIGS. 2–6.—*Austrotachinus fuscipes* sp. n. (2) Labium, lobes of hypopharynx not shown. (3–6) Apical portion of the tergite and sternite of the eighth abdominal segment ; (3) tergite, male ; (4) sternite, male ; (5) tergite, female ; (6) sternite, female. The scale in each case = 0·5 mm., figs. 4–6 being to the same scale as 3.

than the second, the fourth shorter than the third, about as long as the second, widened apically, the fifth to tenth scarcely increasing in breadth but decreasing slightly in length, the fifth about as long as the fourth, all distinctly longer than broad and widened apically, the eleventh longer than the tenth, asymmetrical, bluntly pointed.

Pronotum transverse, nearly one and three-quarter times as broad as long, narrowed in front, broadest behind middle, the sides rounded, the posterior angles obtuse, scarcely rounded. Surface with scattered minute punctures as on head, these becoming somewhat

coarser on posterior third ; ground sculpture vermiculate, for the most part very superficial and indistinct, sometimes, however, very distinct towards the front.

Scutellum with one or two minute punctures and a distinct alutaceous ground sculpture.

Elytra much longer than the pronotum, the sutural length nearly one and one half times as long as this, broadest not far behind base and thence narrowed posteriorly, the sides rounded, the posterior margin lightly rounded. Surface moderately finely and moderately closely punctured, the punctures about as close as those on the pronotum but considerably larger ; between the punctures with a superficial, but distinct, alutaceous ground sculpture.

Tergites of abdomen at base with punctures as on elytra, elsewhere with finer and somewhat closer punctures ; ground sculpture alutaceous, closer than that on the elytra and giving the surface a rather dull appearance. Seventh abdominal segment with a fine white membranous fringe on the apical margin and a long seta on each side at the apex of the paratergite.

Male.—Sternite of the seventh abdominal segment broadly emarginate in middle, the sides of the emargination slightly produced, with one long seta on each side at the posterior angle, one similar seta on each side of the emargination and a much shorter one just internal to this (on each side). Tergite and sternite of the eighth segment as figs. 3 and 4.

Female.—Sternite of the seventh abdominal segment with the posterior margin, except at extreme sides, a straight line, with one long seta on each side of the straight portion. Tergite and sternite of the eighth segment as in figs. 5 and 6.

Length : 6·4–7·0 mm. (with abdomen extended as in fig. 1).

New South Wales : Richmond River (1 ♂, 1 ♀), Acacia Plateau (*J. W. T. Armstrong*) (1 ♀).

Holotype (♂) in the collection of the New South Wales Dept. of Agriculture, Sydney ; allotype (♀) in the collection of Mr. J. W. T. Armstrong, Nyngan, N.S.W.; one paratype (♀) in the collection of the author.

The type male was dissected but the aedeagus, together with a portion of the ninth abdominal segment, was found to be missing.

NEW DIASPIDINI (HOMOPTERA: COCCOIDEA: DIASPIDIDAE) FROM KENYA.

By G. De Lotto.

(*Department of Agriculture, Kenya.*)

Since 1951 a fairly numerous collection of Coccids has been accumulated at the Department of Agriculture, Nairobi, mostly collected in Kenya or received for identification from various localities of East Africa.

A strikingly high percentage of species are apparently new and this paper deals with a first batch of Diaspidini chosen because, apart from small details of minor importance, they fit well into the various genera as recently conceived or restricted by Hall (1946) and Ferris (1937–42).

The holotype of each species will be deposited in the British Museum (Natural History), London, and one paratype in the U.S. National Collection of Coccidae, Washington, D.C. The remainder are in the collection of the Department of Agriculture, Nairobi, Kenya.

Thanks are due to Dr. W. J. Hall, Director of the Commonwealth Institute of Entomology, London, who examined specimens of the species herein described as *Rolaspis parviloba* sp. n. Thanks are also due to Dr. R. H. Le Pelley, Senior Entomologist, Scott Agricultural Laboratories, in whose Section the systematic study of the local Coccid fauna was undertaken, for the reading of the manuscript.

Anotaspis lepelleyi sp. n. (Fig. 1.)

Scale of female reduced to larval and nymphal exuvia only, both strongly chitinised; elongate and highly convex; colour evenly dark orange or reddish-brown. Length 0·8–0·9 mm. Scale of male not seen.

Body of adult female elongate tapering at both ends, with dorsal surface of pygidium and ventral median area of prosoma heavily chitinised at maturity. Mounted specimens 0·6 to 0·8 mm. in length.

Antenna represented by one or two setae arising from a bicuspidate small tubercle. Anterior spiracles with 3 to 5 parastigmatic glands. Thoracic tubercle small, conical. Pygidium truncate having the margin irregularly crenulate and very strongly chitinised, devoid of structure other than a few moderately long, robust setae and six dorsal macroducts. Dorsal surface strongly chitinised with some rather large fenestrations arranged in a pattern as shown in accompanying figure; anal opening small and situated more or less at the centre. Ventral surface membranous with vulval opening unusually large and surrounded by numerous long radiating lines. Some ducts occur on the ventral area between anterior and posterior spiracles; a few others are present on both surfaces of the pygidium, but their number is very variable and in some specimens they are missing altogether. All ducts are apparently referable to the "two-barred" type.

Holotype female and 11 ♀ paratypes. Kenya: Nairobi, 10.iv.1953, collected on underside of leaves of *Teclea simplicifolia* Engl. (*G. De Lotto*).

The genus *Anotaspis* was erected by Ferris in 1941 (*loc. cit.*) for the inclusion of a single pupillarial species, *A. particula*, whose most peculiar character is the total absence of any pygidial structure. Although in *A. lepelleyi* the margin of

the pygidium is provided with some setae and dorsal macroducts, it is clearly evident from all other features that the two species are congeneric.

Ledaspis tenuiloba sp. n. (Fig. 2.)

Scale of female silvery-white, elongate, moderately convex, with exuviae pale yellow. Length 2·1–2·5 mm. Scale of male tricarinate, pure white, with exuvia golden-yellow. Length 1–1·3 mm.

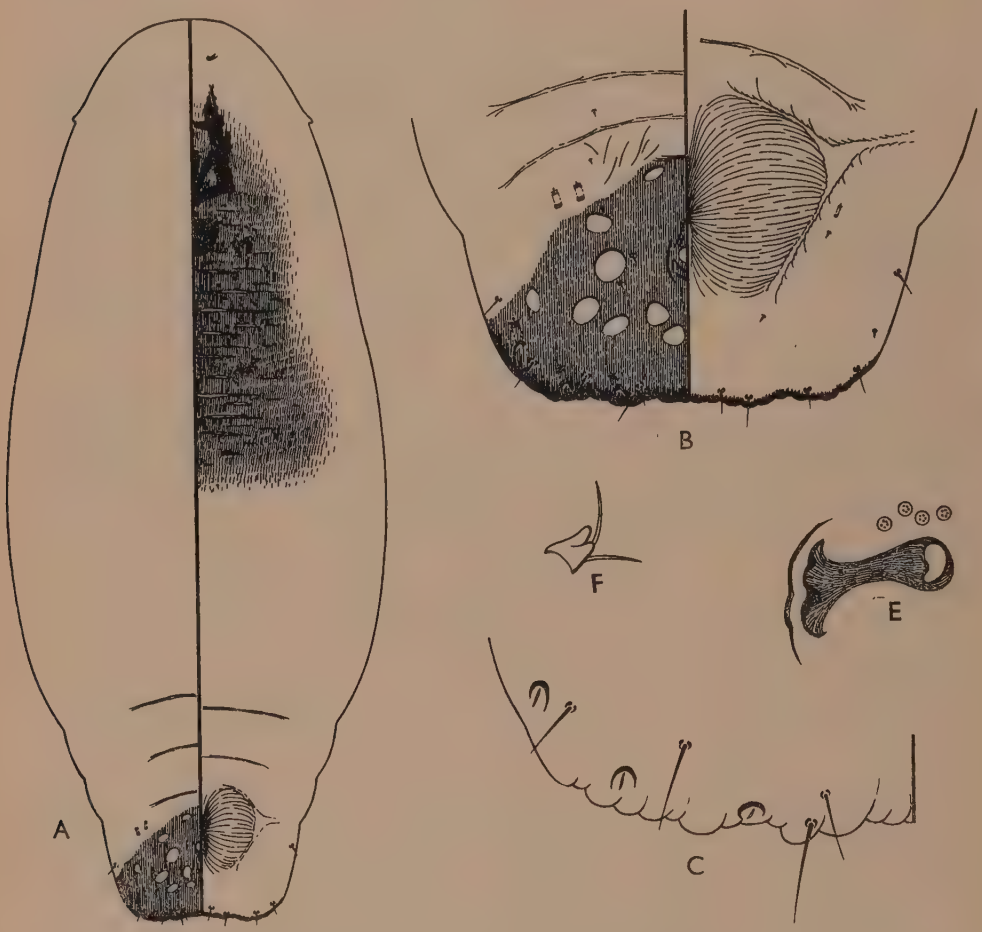


Fig. 1.—*Anotaspis lepelleyi* sp. n. (For key to lettering see p. 25.)

Body of adult female very elongate with prosoma rather heavily chitinised at maturity. Length in mounted specimens 1·2–1·7 mm.

Antenna formed by a subconical robust tubercle carrying two or three setae. Anterior spiracles with 3 to 6 parastigmatic glands; posterior ones with 0 to 2 only. Pygidium rounded and provided with two pairs of lobes. Median lobes small, with apex roughly dentate, basally yoked together to form a U-shaped notch. Second lobes duplex having the inner lobule equal or somewhat longer than the median lobes, rounded or very broadly

pointed ; outer lobule much smaller, being at times present as a mere point. Marginal macroducts with a very long microduct arising from their capitate heads. Dorsal macroducts smaller. Those of the submarginal series extend as far as the metathorax, but only on segments 3 to 5 are they arranged in fairly regular furrows ; macroducts of submedian series well separated from the latter and represented by groups of 1 to 5 ducts on segments 4 (occasionally 3) to 6 and always arranged in a single regular line. A few other macroducts are scattered on the prosoma. Gland spines robust ; first and fourth pairs always arranged

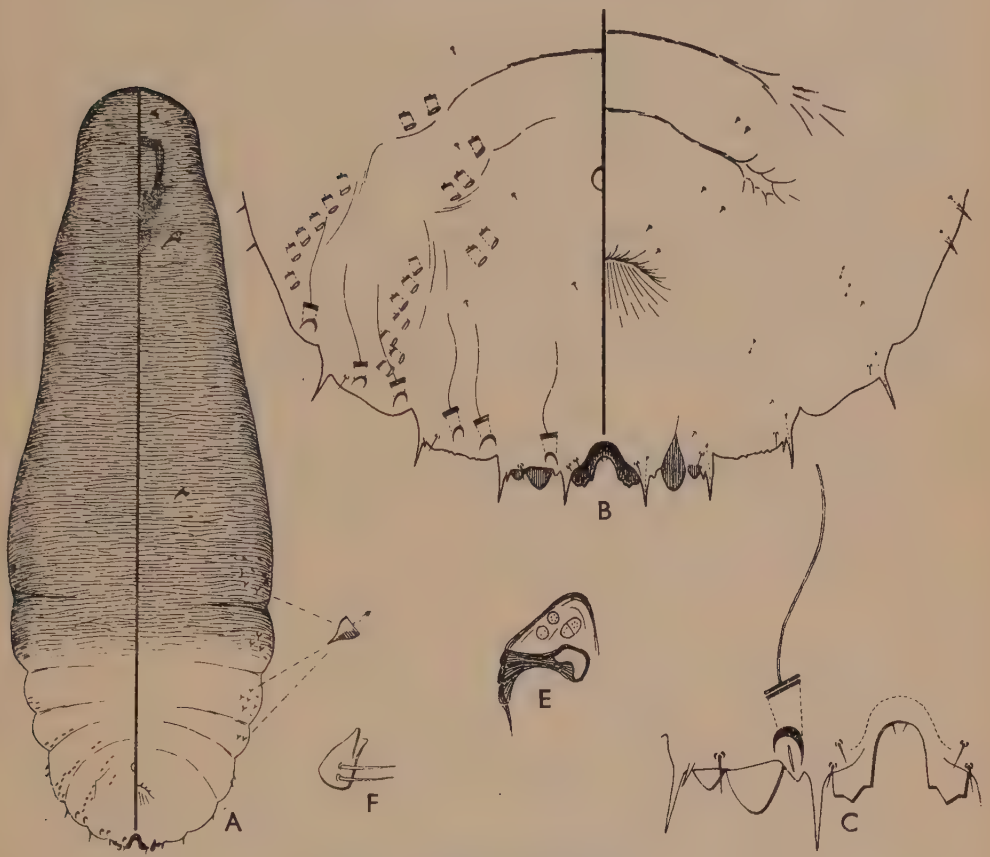


FIG. 2.—*Ledaspis tenuiloba* sp. n.

singly, whilst intermediate two pairs are normally supplemented by another gland spine much shorter. Anal opening small and set near the base of the pygidium. Perivulvar glands absent.

Holotype female and 13 ♀ paratypes. KENYA : Nairobi, 12.iv.1953, collected on both surfaces of leaves of *Elaeodendron stuhlmanni* Loesner (*G. De Lotto*).

Species close to *L. reticulata* (Mal.), from which it is separable by having the ducts of the marginal series provided with very long microducts and by the much smaller median lobes.

Rolaspis anacantha sp. n. (Fig. 3.)

Scale of female madreperlaceous white, very elongate and narrow, moderately convex; larval exuvia translucent yellow; nymphal exuvia brown. Length 3·2–4·1 mm. Scale of male elongate, not carinate, opaque white in colour. Length 1·2–1·5 mm.

Body of adult female membranous, elongate with lateral margin of free abdominal segments prominent and broadly pointed. Length of mounted specimens 1–1·3 mm.

Antenna represented by a stout, conical tubercle carrying two long setae. Anterior spiracles with a cluster of 20 to 28 parastigmatic glands; posterior ones with 0 to 2. Pygidium broadly rounded with only two pairs of lobes. Median lobes small, apically rounded, without any indentation on their edges and yoked together by a basal sclerosis forming a U-shaped notch. Second lateral lobes broader and longer, duplex, with inner lobule smoothly rounded and outer one pointed. Each macroduct of pygidial marginal series provided with a moderately long microduct arising from its capitate head. Dorsal macroducts on segment 6 represented only by the submedian series built up by a group of 7 to 10 pores at times disposed in a single regular line. On segments 5 and 4 the pores are arranged in a submedian and submarginal series. Other numerous macroducts occur on the remaining abdominal and thoracic segments as figured. Gland spines of the pygidial fringe absent, except in one specimen which was provided with a gland spine on both sides of the sixth segment and another specimen also with a gland spine on the sixth segment, and one on the fifth segment at the opposite side. Anal opening near base of pygidium. Perivulvar pores in five groups as follows: median 5–7; anterior laterals 15–18; posterior laterals 20–37. In some specimens one or two pores are present anterior to the median group.

Holotype female and 11 ♀ paratypes. KENYA: Nairobi, 4.viii.1952, collected on leaves of *Osyris weightiana* Wall. (= *O. abyssinica* Hochst.) (*G. De Lotto*).

The unusual absence of the pygidial gland spines distinguishes this species from all others of the genus *Rolaspis*.

Rolaspis halli sp. n. (Fig. 4.)

Scale of female translucent white, large, elongate, fairly convex, at times asymmetric; larval exuvia pale yellow; nymphal exuvia white. Length 4·1–5·3 mm. Scale of male not seen.

Body of adult female fusiform, remaining membranous at maturity. Length in mounted specimens 1·3–1·9 mm.

Antenna is a single long curved bristle inserted in a minute tubercle. Anterior spiracles with 6 to 8 parastigmatic glands. Ventral side of second abdominal segment provided with two very large, rounded and moderately chitinised protuberances. On the dorsal surface small chitinised points or bosses are recognisable submarginally on the head, prothorax, as well as the first and third abdominal segments. Pygidium rounded with two pairs of lobes. Median lobes small, their bases strongly yoked together forming a deep U-shaped notch and having their margin cristate. Second lobes represented by two lobules, both rounded at the apices. Dorsal pores fairly numerous and arranged in segmental rows as far as the prothorax but on third to fifth segment arranged in submarginal and submedian series. Submarginal group on segment 6 absent. Other pores are present on the head. Gland spines of pygidial fringe long and slender, always single. Anal opening at base of pygidium. Perivulvar pores in five groups: median 12–17; anterior laterals 19–27; posterior laterals 30–38.

Holotype female and 8 ♀ paratypes. KENYA: Nairobi, 1.ii.1953, collected on under surface of leaves of *Chaetachme aristata* Planch. (*G. De Lotto*).

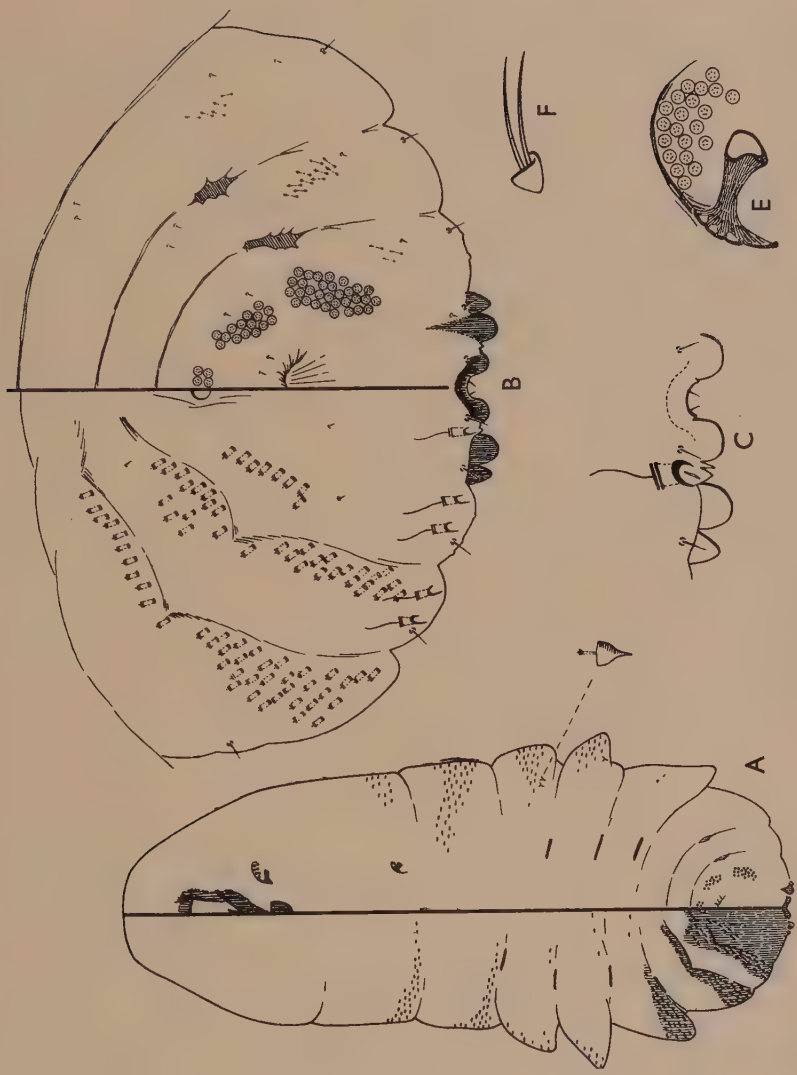


FIG. 3.—*Rolaspis anacantha* sp. n.

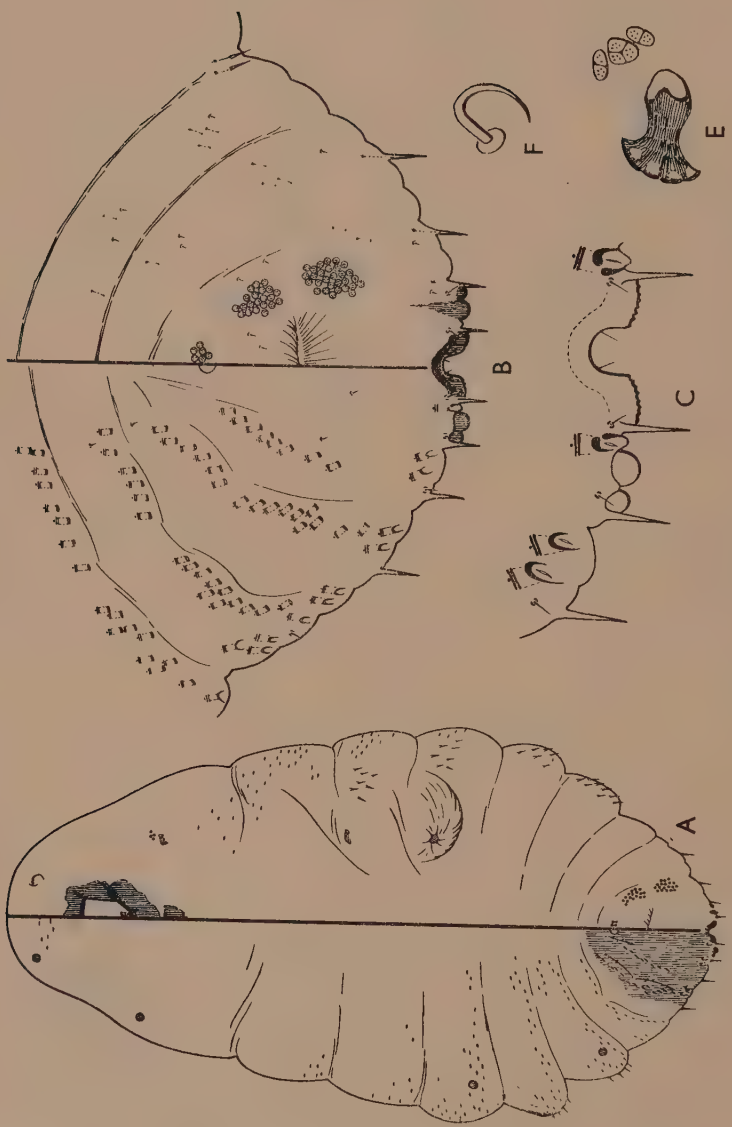


Fig. 4.—*Rolaspis halli* sp. n.

By the presence of the two large protuberances on the venter and by the small chitinised bosses on the dorsum this species departs from all other congeneric ones.

The species is named after Dr. W. J. Hall, Director of the Commonwealth Institute of Entomology, London.

Rolaspis parviloba sp. n. (Fig. 5.)

Scale of female elongate, much broadened posteriorly, only slightly convex, white ; larval exuvia very pale yellow ; nymphal exuvia white. Length 3–3·9 mm. Scale of male elongate with lateral margins parallel, not carinate, white ; exuvia pale yellow. Length 1·4–1·6 mm.

Body of adult female fusiform or oval with dorsal dermis of thorax and first abdominal segment moderately chitinised at maturity. Prosoma sometimes provided with broadly rounded lateral lobes. Length in mounted specimens 1·5–1·9 mm.

Antenna represented by a long, stout, recurved seta inserted on a minute tubercle. Anterior spiracles with 2 to 6 parastigmatic glands. Pygidium rounded with three pairs of lobes. Median lobes small, broader than long, crenulate at the apex and yoked basally to form the characteristic U-shaped notch. Second lobes duplex, somewhat longer than median ones ; inner lobule normally larger than outer lobule, both rounded. Third lobes also bilobed, but very inconspicuous, sometimes recognisable as mere points. Pygidial marginal pores with capitate heads carrying a moderately long microduct. Dorsal pores all of the same size and arranged in regular segmental rows on segments 2 to 6. Pores on fourth and fifth segments clearly separated into submarginal and submedian series ; segment 6 with a few submedian pores only. Gland spines of the pygidial fringe long and arranged singly in the usual position. Small, slightly chitinised bosses are recognisable on dorsal submarginal area of the first, second and third abdominal segments. Anal opening near base of pygidium. Perivulvar pores in five groups : median 7–13 ; anterior laterals 13–23 ; posterior laterals 21–31.

Holotype female and 7 ♀ paratypes. KENYA : Nairobi 15.iii.1951, collected on leaves of *Gelonium procerum* Prain. (*G. De Lotto*).

This species appears close to *R. spiculata* (Hall), from which it can be separated by the presence of a third pair of pygidial lobes and the bosses on the dorsal side of the abdomen.

Rolaspis procera sp. n. (Fig. 6.)

Scale of female silvery-white, very elongate and narrow, convex ; larval and nymphal exuviae yellow. Length 3·2–3·5 mm. Scale of male opaque white, elongate, with a single median carina. Length 1·2–1·4 mm.

Body of adult female very elongate with prosoma rather heavily chitinised. In specimens which are not fully mature the dermis shows a slight reticulation in small polygonal areas. Length in mounted specimens 1·3–1·6 mm.

Antennae consist of a stout tubercle with two or three setae. Anterior spiracles with 3 to 6 parastigmatic glands. Pygidium broadly rounded with only two pairs of lobes. Median lobes small, almost recessed into pygidium, with apical edges stoutly crenulate. Second lobes very large, duplex. Inner lobule about twice the length of the median lobes and broadly rounded, outer lobule smaller and pointed. Marginal pygidial macroducts large and provided with a moderately long microduct inserted on the capitate head. Dorsal macroducts on segments 3 to 5 arranged in regular rows, clearly separated into the usual submedian and submarginal series. Segment 6 provided with only a submedian series of 1 to 2 pores. All other dorsal pores smaller and extending along the margin of the body as far as the prothorax ; on the first and second abdominal segments some pores occur right across the median area. Gland spines robust and arranged singly. Anal opening

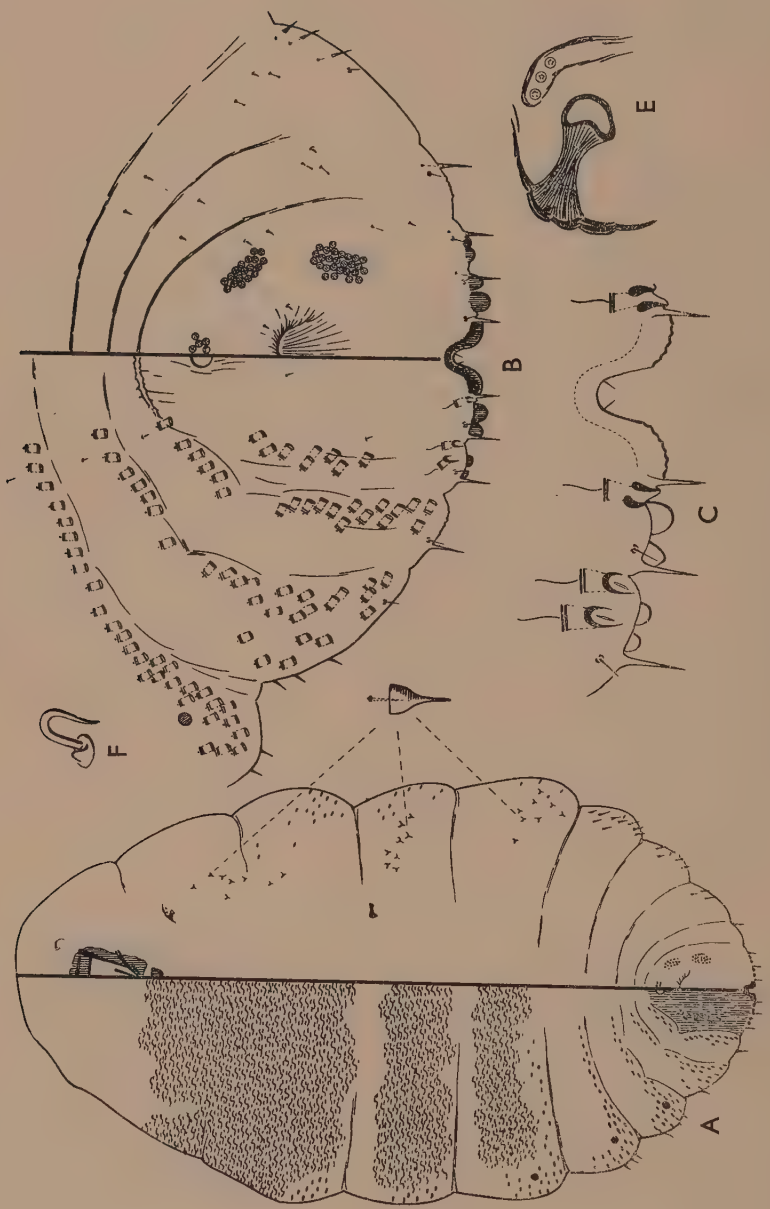


FIG. 5.—*Rolaspis parviloba* sp. n.

FIG. 6.—*Rolaspis procera* sp. n.

near base of pygidium. Perivulvar glands in five groups only : median 4–5 ; anterior laterals 14–17 ; posterior laterals 17–22.

Holotype female and 9 ♀ paratypes, KENYA : Nairobi, 21.vi.1953, collected on leaves of *Elaeodendron stuhlmanni* Loesner (*G. De Lotto*).

This species departs from all others included in the genus *Rolaspis* by having the inner lobule of the second pair of pygidial lobes distinctly larger than the median ones.

REFERENCES.

FERRIS, G. F., 1937–42, *Atlas of the Scale Insects of North America*, Series i–iv.

HALL, W. J., 1946, On the Ethiopian Diaspidini (Coccoidea). *Trans. R. ent. Soc. Lond.* **97** : 497–583.

Key to the lettering of figures.

A. Adult female.
B. Pygidium of adult female.
C. Pygidial margin—dorsal aspect.
D. Pygidial margin—ventral aspect.
E. Anterior spiracle.
F. Antenna.

TWO NEW SPECIES OF MYCETOPHILIDAE (DIPTERA: NEMATOCERA) FROM BRITAIN.

By Paul Freeman, M.Sc., F.R.E.S.

(*Department of Entomology, British Museum (Natural History)*).

The two species described below were amongst some material bred by the late Professor P. A. Buxton, C.M.G., F.R.S., and sent to me for identification. Professor Buxton very kindly presented the type series of both species to the British Museum (Nat. Hist.); I take pleasure in naming the *Sciophila* in his honour.

Sciophila buxtoni sp. n.

Microtrichia present on wing membrane only at the extreme base of wing; scutum reddish and without darker stripes; pleura, postnotum and abdomen blackish; all femora red; ninth tergite of male contracted at apex. Body colour not unlike that of *plurisetosa* Edwards, but it is easily distinguished by the shape of the ninth tergite and by the absence of microtrichia over most of the wing.

The structure of the ninth tergite of the male is very similar to that of *S. dziedzickii* Edwards, although it is narrower apically. The latter species was figured by Dziedzicki in his *Atlas* (1915 : figs. 68–70) under the name *thoracica* Staeger, but Edwards (1924 : 165) showed that it was not the true *thoracica* of Staeger and he renamed it *dziedzickii*. Dziedzicki was presumably figuring specimens described by Winnertz (1863 : 757) under the name *thoracica*. It seems clear that the present species is different because Winnertz mentions the presence of three black stripes on the thorax of his specimens (as in true *thoracica* Staeger), also in Dziedzicki's figure no long spines are shown on the inner lobe of the style in the dorsal aspect and the outer lobe is smaller and shaped differently.

In Edwards' key (1925 : 560), *S. buxtoni* runs out with *limbatella* Zett., *rufa* Meig. and *ochracea* Walker, from all of which it may be distinguished by the pale thorax and black abdomen, besides hypopygial differences.

Wing length 3·5–5·0 mm.

Head black, palpi brownish-yellow with black hairs, antennae black, first two segments brown or yellowish. *Thorax* with scutum and prothorax reddish-yellow, lacking dark markings, stripes not indicated, hairs yellow; scutellum brown, pleura and postnotum blackish-brown in male, with pale hair; in female these sclerites paler brown. *Legs* yellow except for a black spot beneath each trochanter, tarsi appear darker because of the dense covering of dark hair. *Wings* densely covered with macrotrichia, microtrichia confined to a band around the anal angle; Sc_2 meeting R in the middle of the small cell. Halteres yellow. *Abdomen* of male black and rather shining, of female paler, almost yellowish at the incisures giving a banded appearance. Male hypopygium (fig. 1) with ninth tergite contracted apically, style as shown, inner lobe with 24–36 capitate and pectinate spines and two long spines, outer lobe with two long spines ventrally and a short sharp spine on the inner dorsal angle.

Holotype male and 2 ♂, 2 ♀ paratypes, Bucks.: Gerrard's Cross, i.1954 (*P. A. Buxton*). All bred from *Trametes confragosa* (Bolt.) Jorstad (*rubescens* Fr.), and *T. gibbosa* (Pers.) Fr. The fact that the insect has been reared twice from *Trametes* spp. but not from over 100 samples of 25 other species of Polyporaceae is of interest.

Phronia sinuata sp. n.

Thorax yellowish-brown, abdomen with pale bands at the incisures, hypopygium pale; posterior coxae darkened, posterior femora blackish at the tips; wings unmarked, costa only slightly produced. Similar to *P. obtusa* Winnertz, but separated by the yellow hypopygium and dark coxae, by the shape of the ventral margin of the sterno-coxite and by the presence of two long curved hairs on the tergal aspect of the inner lobe of the style. Resembles *obtusa* in the presence of a single sinuous striated band on the inner lobe of the style.

Wing length 2–2·5 mm.

Head, mouthparts, antennae dark brown, face, scape and pedicel yellow. *Thorax* with yellowish-brown scutum, stripes hardly indicated, bristles darker, remainder of

Figs. 1–3.—Male hypopygia of new species of Mycetophilidae. (1) *Sciophila buxtoni* tergal aspect; (2) *Phronia sinuata* sternal aspect; (3) the same in tergal aspect.

thorax rather darker. *Legs* yellow, posterior coxae distinctly darkened, middle coxae sometimes as well, apices of posterior femora blackish. *Wings* unmarked, costa slightly produced, venation normal, posterior fork short, anal area with a few erect macrotrichia on the membrane. Halteres yellow. *Abdomen* brown with yellow markings ventrally and at the incisures, i.e. each band overlaps two segments, on segments 1–4 ; male hypopygium and apex of female abdomen yellowish. Hypopygium (figs. 2–3) with characteristic apical margin to sterno-coxite ; outer lobe of style simple, undivided ; inner lobe with a single, rather broad, sinuous striated band ; in tergal aspect, inner lobe bears three stout spines and at its inner extremity two long curved hairs.

Holotype male and 4 ♂, 1 ♀ paratypes, Bucks.: Gerrard's Cross, ix.1953 (*P. A. Buxton*) ; 1 ♂, 4 ♀ same locality and collector, xii.1954. All specimens bred from *Calocera viscosa* (Pers.) Fr. This insect has emerged from two of seven collections of *C. viscosa*, but not from five collections of *Calocera cornea*, nor from the other Tremellales (*Dacryomyces*, *Auricularia*) which have been examined by Professor Buxton.

References.

Dziedzicki, H., 1889, Revue des espèces européennes du genre *Phronia*, etc. *Horae Soc. ent. Ross.* **23** : 404–532.

——, 1915, Atlas des organes genitaux des types de Winnertz et des genres de sa collection de Mycétophiles. *Publ. Soc. sci. Varsovie* **3** : 1–16, pls. i–xxi.

Edwards, F. W., 1913, Notes on British Mycetophilidae. *Trans. ent. Soc. Lond.* **1913** : 334–382.

——, 1924, Notes on the types of Mycetophilidae described by Staeger and Zetterstedt. *Ent. Tidskr.* **45** : 160–8.

——, 1925, British fungus-gnats. With a revised generic classification of the family. *Trans. ent. Soc. Lond.* **1925** : 505–670.

Landrock, K., 1926–7, Fungivoridae (Mycetophilidae), *in* Lindner, *Flieg. Palaearkt. Reg.* **2** (1), pt. 8.

Staeger, C., 1840, Systematisk fortegnelse over de i Danmark hidtil fundne Diptera. 3. Kröjer : *Naturhist. Tidsskr.* **3** : 228–88.

Winnertz, J., 1863, Beitrag zu einer Monographie der Pilzmücken. *Verh. zool.-bot. Ges. Wien* **13** : 637–964.

NEW SPECIES OF AFRICAN GEOMETRIDAE.

By D. S. Fletcher, F.R.E.S.
(*Department of Entomology, British Museum (Natural History).*)

PART I.

In the course of determining a number of small collections of Geometridae made in East Africa in recent years several new species were put on one side for future description, together with some notes on changes in synonymy. They have now been gathered together and are published in the following pages. Thanks are due to several enthusiastic and industrious collectors in East Africa for the material which they have presented to the British Museum, in particular to Mr. T. H. E. Jackson of Kitale for the many *Eupithecia* species from the Mt. Elgon region, to Mr. E. C. G. Pinhey of the Coryndon Museum and to Mr. A. L. H. Townsend of Nakuru.

The colour names used in the descriptions are taken from Ridgway's *Color Standards and Color Nomenclature*. The figures of the moths are twice natural size; the drawings of the male genitalia of *Collix muscosata* and the female genitalia of *Horisme longispicata* are magnified × 55; the remainder of the genitalia drawings are × 80. The types, except where otherwise stated, are in the British Museum (Natural History).

GEOMETRINAE.

Pingasa abyssiniaria (Guenée).

Hypochroma abyssiniaria Guenée, 1857, *Hist. nat. Ins., Spec. gén. Lép.* **9** : 277.

Examination of the genitalia of *P. abyssiniaria* and of *P. distensaria* Walker (1860) with its form *respondens* Walker (1860), hitherto regarded as the same species, has shown *abyssiniaria* to be distinct. The unique female type of *abyssiniaria*, collected by Schimper in Abyssinia and stated by Guenée to be in the Paris Museum, is not listed by Viette in the catalogue of the Guenée Geometridae types in that institution. Viette has recently expressed the opinion in a letter that the type has in all probability been destroyed. As the two species overlap in Kenya it is important that the Guenée name should be stabilised. A female neotype has therefore been selected from a series of 25 males and three females collected in the months of January–March, July, October and December at Harar by Mr. R. E. Ellison and presented by him to the British Museum.

♀. 50 mm. Antennae simple. Head, thorax, abdomen and upper side of wings white irrorate with cinnamon and fuscous, giving the whole a yellowish-white appearance. Antemedial fascia on fore wing boldly lunulate, fuscous black; discocellulars streaked with fuscous. On both wings the postmedial fasciae are deeply dentate and fuscous black; the dentate subterminal shades, parallel to the postmedial fasciae, are fuscous. Cell spot on hind wing fuscous black. Underside white, without marking.

The neotype is thus consistent with Guenée's original description.

Neotype ♀, ABYSSINIA: Harar, 3.iii.1938 (*R. E. Ellison*).

The male genitalia of true *abyssiniaria* differ from those illustrated by Janse (1934), which in fact represent *distensaria*, in being symmetrical and lacking the sharply pointed, curved process on the left valve; the bilobed uncus is much less stout and the apex of the gnathus is a scobinate plate with two short, toothed processes; the costal margin of the valve is smooth and very narrowly rounded at the apex; the apical quarter of the distal margin is produced, with a rounded projection on its inner surface.

In the female genitalia of *abyssiniaria* the small ductus bursae is square and the almost ovate bursa copulatrix is one and a half times as long as broad. In *distensaria* the ductus bursae is twice as long as broad; the bursa copulatrix is similarly proportioned and tapered anteriorly.

Townsend, who has reared both species and also taken wild larvae, states in a letter that he has always found the larvae of *abyssiniaria* on *Carissa edulis* and *Schinus molle*; those of *distensaria* have always been found on *Heteromorpha arborescens* and *Dodonea viscosa*.

Distribution.—ABYSSINIA and KENYA.

Pingasa abyssiniaria **rufata** subsp. n.

The brown irroration of the nominate subspecies is replaced on both wings by vinaceous.

Holotype ♂, Allotype ♀, KENYA: Nakuru, bred (*A. L. H. Townsend*).

Paratypes: 6 ♂, 3 ♀ in the British Museum (Nat. Hist.), 15 ♂, 11 ♀ in coll. Townsend, type locality; 1 ♀, SUBUKIA; 1 ♀, S. KAVIRONDO: Suna.

Pingasa distensaria (Walker).

Hypochroma distensaria Walker, 1860, *List. Lep. Ins. B.M.* **21**: 444.
Pingasa abyssiniaria Guenée Janse *nec* Guenée, 1934, *Moths S. Africa* **2**: 258, pl. 11: 5; fig. 70.

The species treated by Janse as *abyssiniaria* Guenée, whilst being superficially similar to that species, differs from it in the structure of the genitalia of both sexes, as already shown; it is identical with *distensaria* Walker, which Janse included in the synonymy of his typical *abyssiniaria*.

Pingasa distensaria respondens (Walker).

Hypochroma respondens Walker, 1860, *List Lep. Ins. B.M.* **21**: 428.
Pingasa abyssiniaria respondens, Walker Janse, 1934, *Moths S. Africa* **2**: 258.

Superficially similar to *abyssiniaria rufata*, the olive buff irroration on both wings of typical *distensaria* being replaced by vinaceous.

Gradations between the two forms of male genitalia mentioned by Janse have also been found among British Museum material and support his view that the two extremes are not specific.

Though the name *respondens* has page priority over *distensaria*, *distensaria* is very much the commoner form and, for that reason, I use it as the specific name (1953, *Copenhagen Decisions on Zoological Nomenclature*: 66). This treatment of the names follows that of Janse, who placed *distensaria* in the

synonymy of what he believed to be typical *abyssiniaria* and used *respondens* for the less common rufous form.

Prasinocyma pumilata sp. n. (Pl. IV, figs. 29, 30, 34, 38.)

♂ 16 mm., ♀ 21 mm. Male antennae pectinate, the longest pectinations equal in length to five times the diameter of the shaft; female antennae filiform. Palpi in both sexes equal in length to the diameter of the eye. Palpus and frons pale pinkish-buff. Thorax abdomen and wings uniformly paris green, the cell spots a slightly darker shade. Underside much paler and glossy.

Genitalia.—Male: Saccus truncate. Uncus short, simple. Distal margin of valve angled at three-quarters, the apical quarter narrowed to a rounded apex; costa lightly sclerotised; harpe vestigial. Aedeagus flattened laterally; apical quarter sclerotised ventrad. Vesica with scobinate ridge at middle and sclerotised patch at apex, shaped like a curved, inverted spine. Eighth sternum bilobed, as shown in figure.

Female: Genital plate round, with two sclerotised ridges at middle of posterior margin. Bursa copulatrix globular and membranous, without signa.

Closely related to *P. tranquilla* Prout (1917); distinguished readily from other species in the genus by its small size.

Holotype ♂ and Allotype ♀, KENYA: Voi, xi.1951 (*D. Sheldrick*).

Paratypes: 1 ♂ and 2 ♀ in the Coryndon Museum, 1 ♀ in the British Museum (Nat. Hist.), type locality.

Prasinocyma pedicata sp. n. (Pl. IV, figs. 32, 33, 35, 37.)

Prasinocyma simiaria Guenée Prout *nec* Guenée, 1930, *in* Seitz, *Gross-schmett. Erde* **16**: 22, pl. 3: c.

Syndromodes tenuis Warren, 1898, *Novit. zool.* **5**: 16 (♂ *nec* ♀).

♂ ♀ 22–26 mm. *Male:* Antennae pectinate for two-thirds of their length, the longest pectinations equal in length to five times the diameter of the shaft. Palpi equal in length to the diameter of the eye. Hind tibia dilate, with a hair-pencil and four spurs; the terminal process equal in length to that of the longest spur.

Female: Antennae filiform. Palpi one and a half times as long as the diameter of the eye. Hind tibia with terminal pair of spurs only.

In both sexes underside of palpus white; upperside fuscous tinged with dark vinaceous. Frons tawny-olive. A narrow bar of white between the antennae. Head, thorax and abdomen uniformly glaucous green. Wings glaucous green, lightly striate with white. Cell spots wanting. Underside much paler and glossy.

Genitalia.—Male: Saccus broadly produced anteriorly. Uncus curved ventrad, simple. Gnathus not developed. Valve with a projection at three-quarters of distal margin; apical quarter narrowed to a rounded apex; apical half of distal margin thickened and almost tubular. Harpe slender, the apex tapered and curved ventrad, equal in length to the greatest width of the valve. Aedeagus slender, flattened laterally, the ventral edge minutely serrate. Eighth sternum shaped as shown in figure. *Female:* Genital plate almost ovate, with two lobes posteriorly as shown in figure. Ductus bursae as long as the genital plate; bursa copulatrix ovate and membranous, without signa.

Holotype ♂, IVORY COAST: Bingerville, 11–15.ix.1915 (*G. Melou*).

Allotype ♀, IVORY COAST: Bingerville (*G. Melou*).

Paratypes, 2 ♂, 4 ♀, type locality; 1 ♂, NIGERIA: Warri; 4 ♂, 1 ♀, SIERRE LEONE: Moyamba.

P. simiaria Guenée (figs. 31, 36) (1857, *Hist. nat. Ins., Spec. gén. Lép.*

9 : 359), with which *pedicata* has hitherto been confused, is similar in external structure and coloration but differs markedly in the male genitalia. The uncus is flattened laterally ; the arms of the gnathus are short and broad, with the extremities dilate and strongly scobinate. The valve has a slight tooth-like projection at three-quarters of the distal margin and the harpe is stout and straight. The aedeagus is straight and tapered ; the eighth sternum is shaped as shown in the figure.

There are unfortunately no female specimens of *simiaria* in the British Museum, so a comparison of the genitalia of that sex has not been possible.

Pulchralata gen. n.

Antennae bipectinate in the male, filiform in the female. In both sexes the palpi are minute and the tongue is wanting. Hind tibae with one pair of spurs only ; frenula wanting. Neuration and wing shape as shown in figure.

Genitalia.—Male : Uncus broad, bifid. Apex of gnathus pointed. Costal and distal margins of valve parallel, apex rounded ; a small pointed process arises in basal third. Aedeagus tapered to a point apicad. Vesica without cornuti. *Female :* Genital plate lightly sclerotised, circular. Ductus bursae and bursa copulatrix membranous and without signa.

Differs in neuration from the related *Xenochlorodes* in that vein *Sc*1 is remote from the stalk of veins *Sc*2–5 and that *Sc*2 does not anastomose with *Sc*1. The colour and pattern, however, are unlike those of any other known species in the subfamily.

Type species : *Pulchralata fowleri* sp. n. The gender of the genus is feminine.

Pulchralata fowleri sp. n. (Pl. I, fig. 1 ; Pl. III, figs. 22–24.)

♂ 24 mm., ♀ 28 mm. Head pale pinkish buff. Palpus, frons, prothorax and first abdominal segment old rose. Remainder of thorax and abdomen pale pinkish buff irrorate with old rose. Proximal part of fore wing, from two-thirds of costa to one-half of inner margin, and the area distad of the transverse fascia, old rose. Area between ecru-olive, bounded distally by a fascia of primrose yellow extending from apex to two-thirds of inner margin. Hind wing similarly coloured, but with the basal area of old rose much reduced and the distal area much increased. Underside similarly marked.

Holotype ♂ and Allotype ♀, KENYA : Nairobi, Ngong, ii.1954 (*R. Coulson*).

Paratypes : 1 ♂ in the British Museum, 1 ♂ in the Coryndon Museum, type locality, xi.1953 (*J. Fowler*).

Cancellalata gen. n.

Male antennae pectinate to one half of shaft, female antennae ciliate. In both sexes the palpi are long-scaled and extend to the frons, which is smooth. Hind tibiae with only one pair of spurs. Frenulum wanting. Neuration and wing shape as shown in figure.

Genitalia.—Male : Uncus spatulate ; socii present. Apex of gnathus pointed. Valve simple, narrowly rounded at the apex. Aedeagus tapered apicad ; vesica with a single weakly sclerotised cornutus, equal in length to the aedeagus. *Female :* Genital plate ovate, lightly sclerotised. Ductus bursae minute ; bursa copulatrix pyriform, sclerotised posteriorly as shown in figure, without signa.

By neuration and leg structure seemingly related to *Eucrostes* and *Acidaliastis*.

Cancellalata subumbrata sp. n. (Pl. I, fig. 4 ; Pl. III, figs. 25–28.)

♂ ♀ 14–16 mm. Head white. Frons, thorax and abdomen cartridge buff. Ground colour of wings maize yellow. Fore wing : Basal area lightly suffused with vinaceous buff ; medial area strongly suffused with vinaceous buff, toning to buff yellow distad ; postmedial fascia lunulate, with a strong projection between veins *M*3 and *Cu*1. Subterminal fascia lunulate, buff yellow ; the veins in the distal area are similarly marked, giving a latticed appearance. Hind wing suffused with vinaceous buff proximad. The ringed, streaked cell spot, the transverse fascia and the veins are marked in buff yellow. Underside cartridge buff ; costal and proximal two-thirds of fore wing suffused with vinaceous drab.

Holotype ♂, Allotype ♀ and 1 Paratype ♂, UGANDA : Kampala, x–xi.1949, bred, (*D. G. Sevastopulo*).

Mirifica gen. n.

Antennae pectinate to three-quarters, the longest pectinations at midway equal in length to the diameter of the shaft. Tongue present. Palpi equal in length to one-half the diameter of the eye. Frons smooth. Hind tibiae with two pairs of spurs. Frenulum present. Neuration and wing shape as shown in figure.

Genitalia.—Uncus evenly tapered ; socii curved dorsad, equal in length to the uncus. Apex of gnathus almost square. Valve with costa and distal margin parallel ; apex narrowly rounded. The sclerotised harpe has two projections ; one tapered and curved at the costal side ; the other, distad of the first, tapered and fusing with a membranous process of two-thirds of the distal margin. Aedeagus slender and bifid at the apex ; vesica with one short, spine-like cornutus apicad.

Type species : *Mirifica variata* sp. n. The gender of the genus is feminine.

Appears to be an isolated genus.

Mirifica variata sp. n. (Pl. I, fig. 2 ; Pl. III, figs. 19–21.)

♂ 28 mm. Palpus and frons snuff brown or fuscous. Forelegs, mid and hind tibiae snuff brown or vinaceous drab. Head, thorax and abdomen cartridge buff to cinnamon. Wings patterned as shown in figure. The proximal part of the fore wing, bounded distally by the black postmedial fascia, is cinnamon to vinaceous drab irrorate with black, especially along the costa. The pale cell spot is ringed with black. The area distad of the postmedial fascia is divided by the subterminal fascia, which is indicated by one or two fuscous spots at and below the costa and just before the inner margin ; the proximal half of this area is cream buff, the distal half pale olive buff, the whole lightly irrorate with black. The hind wing is cartridge buff, the distal and anal margins lightly irrorate with black ; the ante- and postmedial fasciae, marked by spots at the anal margin only, are also black. Cell spot wanting. Fringes on both wings cinnamon.

Holotype ♂, KENYA : Machakos, Makabete, xi.1951 (*E. C. G. Pinhey*).

Paratypes : 1 ♂ in the British Museum (Nat. Hist.), 1 ♂ in the Coryndon Museum, type locality.

STERRHINAE.

Sterrha townsendi sp. n. (Pl. I, fig. 3 ; Pl. V, fig. 42.)

♀ 18 mm. Palpus rough scaled, fuscous black, extending to similarly coloured frons. Head, thorax and abdomen cinnamon buff. Both wings glossy, cinnamon buff, irrorate and patterned with fuscous. Fore wing : Antemedial fascia broadly excurved ; medial broad at costa, weakening posteriorly ; postmedial parallel with distal margin, strongly

marked; subterminal area more strongly irrorate with fuscous. Hind wing: Antemedial and medial fasciae faintly marked or wanting. Postmedial and double subterminal fasciae strongly marked and parallel with distal margin. On both wings the cell spots and the dots at the ends of the veins are fuscous black. Underside similarly marked.

Ductus bursae membranous and extremely short. Bursa copulatrix three times as long as broad, membranous anteriorly and sclerotised, ribbed and spined posteriorly, as shown in figure.

In pattern and coloration similar to *S. lalasaria* Swinhoe (1904), but the postmedial fascia is straighter and the wings much more elongate.

The Nakuru specimens were reared by Townsend from larvae which he found on a common weed, *Galinsoga parviflora*.

Holotype ♀, KENYA: Nakuru, bred, 1952 (*A. L. H. Townsend*).

Paratypes: 1 ♀ in the British Museum, 2 ♀ in coll. Townsend, type locality; 1 ♀, Nairobi.

(Part II, which will include Pls. I–VI, to follow).

NEW SPECIES OF AFRICAN GEOMETRIDAE.

By D. S. Fletcher, F.R.E.S.

(*Department of Entomology, British Museum (Natural History).*)

PART II

LARENTIINAE.

Piercia jacksoni sp. n. (Pl. I, fig. 5 ; Pl. V, fig. 43.)

♀ 20 mm. Palpus, thorax and abdomen cinnamon mixed with fuscous. Fore wing : Basal area cinnamon irrorate with fuscous, followed by a narrow band of olive green lightly irrorate with fuscous and bounded distally by a slender white fascia. Antemedial fascia fuscous, broad and almost straight. Medial area fuscous and cinnamon, very lightly irrorate with white and bounded distally by an interrupted, slender white fascia, which extends diagonally outwards from the costa to vein *M*3 and then straight from vein *Cu*2 to the inner margin. Apical and terminal areas heavily clouded with fuscous, the former divided by a diagonal streak of olive green from the apex to the postmedial fascia. Cell spot minute. Hind wing uniformly fuscous, the postmedial fascia a slightly darker shade. Underside : A mixture of fuscous and cinnamon, the medial and apical areas of both wings more darkly shaded, the former bounded distally by a broad, pale fascia divided by a slender fuscous line.

Genitalia.—Genital plate with two slight, sclerotised depressions, one at each side of the ostium bursae. Ductus bursae sclerotised and broadened anteriorly ; bursa copulatrix membranous and ovate with a central dentate signum, as shown in figure.

Superficially similar in appearance to *Piercia spatiosata* Walker (1862), but differing from it in having a uniformly fuscous hind wing.

Holotype ♀ and 1 Paratype ♀, Uganda : Kigezi, Mafuga Forest, vi.1951 (*T. H. E. Jackson*).

Collix muscosata sp. n. (Pl. I, fig. 9 ; Pl. V, figs. 39, 40.)

♂ 30 mm. Palpi twice as long as the diameter of the eye. Antennae filiform.

Palpus, head, thorax and abdomen a mixture of cartridge buff, fuscous and olive green. Fore wing similarly coloured, with a broad postmedial fascia faintly defined in a darker shade ; discocellulars narrowly fuscous ; a conspicuous spot of cartridge buff at the point from which veins *M*3 and *Cu*1 arise. Lower median and other veins distad of the postmedial fascia streaked alternately fuscous and cartridge buff. Distal half of hind wing a mixture of fuscous, olive green and a little cartridge buff ; the proximal half is suffused with cinnamon. The transverse fasciae are clearly marked in fuscous ; cell dot minute. Veins marked similarly to those of the fore wing. Termen of both wings fuscous. Underside glossy, the basal two-thirds and the termen of each wing cinnamon drab ; distal third a conspicuously paler buffy brown, divided by a slender fascia of cinnamon drab.

Genitalia.—Tegumen broad. Uncus spatulate. Apex of gnathus with two blunt processes and with well developed subscaphium attached. Transtilla broad, lightly sclerotised. Labides tapered apically. Juxta broadened towards bifurcate apex. Valve pyriform, simple ; the apex is broadly rounded. Aedeagus stout, arched ; vesica with one cornutus, a spine one-third as long as the aedeagus and a small sclerotised area near apex. Eighth sternum Y-shaped.

Distinguished from other African species of *Collix* by the greatly reduced cell spot on the fore wing and by the presence there of a conspicuous spot of cartridge buff at the point from which veins *M*3 and *Cu*1 arise.

Holotype ♂, UGANDA : Kigezi, Mafuga Forest, vi.1951, (*T. H. E. Jackson*).

Horisme longispicata sp. n. (Pl. I, fig. 8 ; Pl. V, fig. 41 ; Pl. VI, figs. 44, 45.)

♀ 26 mm. Antennae of both sexes lamellate and ciliate. Palpi twice as long as the diameter of the eye.

Palpus, frons and abdominal segments 2–7 in the male and 2–8 in the female fuscous ; head, thorax, first abdominal segment in both sexes and segment 8 in the male pinkish buff.

Male : Fore wing : Costa, medial area from costa to upper median vein and from lower median vein to inner margin, fuscous ; remainder of proximal two-thirds of wing cartridge buff lightly irrorate with cinnamon. Postmedial and subterminal fasciae cartridge buff lightly irrorate with cinnamon. Postmedial and subterminal fasciae cartridge buff, clearly marked on costa only. Terminal area irregularly suffused with fuscous. Hind wing cartridge buff, anal and distal margins suffused with fuscous ; beginnings of pale transverse fasciae conspicuous on anal margin ; fuscous terminal band divided by a pale, interrupted subterminal fascia. Underside : Fore wing suffused with fuscous. Hind wing cartridge buff with five interrupted fuscous transverse fasciae.

Female : Fore wing similarly patterned, but the cartridge buff is replaced by tawny and the fuscous of the costa and medial area is replaced by russet. The subterminal fascia is marked by pale dots between the veins. Hind wing : Proximal part of wing to postmedial fascia fuscous as on fore wing. Underside of both wings suffused with fuscous, the transverse fasciae faintly marked in a darker shade.

Genitalia.—Male : Uncus short with a minute hooked tip. Labides slightly longer than uncus. Papillae slender, as long as labides. Valve tapered to a narrowly rounded apex ; costa and basal half of distal margin sclerotised, remainder membranous. Vesica with a single slender cornutus almost as long as the aedeagus and a small scobinate patch near apex. *Female :* Ductus bursae membranous with central part sclerotised. Bursa copulatrix elliptical ; anterior extremity membranous, the remainder sclerotised, ribbed and spined as shown in figure.

Similar in size and wing shape and to a certain extent in pattern to *H. pallidimacula* Prout (1925), but the cartridge buff proximal area of the fore wing distinguishes it at once from that species.

Holotype ♂ and Allotype ♀, UGANDA ; Kigezi, Mafuga Forest, vi.1951, (*T. H. E. Jackson*).

Paratypes : 1 ♀, type locality ; 1 ♂, BELGIAN CONGO : W. Kivu, Kisibia, Bugoie Forest.

Horisme jansei sp. n.

Horisme suffusa Hampson Janse *nec* Hampson, 1934, *Moths S. Africa* 2 : 108, pl. 2 : 15, fig. 33.

♂ 35 mm. Antennae filiform. Palpi equal in length to the diameter of the eye. Palpus frons and head fuscous. First abdominal segment pinkish-buff, second fuscous black. Thorax and remainder of abdomen pinkish-buff and cinnamon irrorate with fuscous, especially in the medial and subterminal areas. Transverse fasciae ill-defined, fuscous. Subterminal fascia defined by a series of fuscous lunules between the veins. Anal and cubital veins spotted with fuscous, white and cinnamon. Cell spot minute, fuscous black.

Costal half of hind wing cartridge buff; posterior half irrorate as on fore wing; postmedial fascia plainly marked in fuscous black on anal margin; anal and cubital veins marked as on fore wing.

The male genitalia of *jansei* match so well Janse's figure and description of the species he called *suffusa* Hampson that they are plainly conspecific.

The species is closely related to *H. obscurata* Prout (1913), from which it may be distinguished by its larger size and the strongly marked lunules of the subterminal fascia. The genitalia of both species are figured by Janse (1934).

Holotype ♂, Cape Province: Transkei, Katsberg, 1949 (*H. B. D. Kettlewell*).

Paratypes: 1 ♂, S. Africa: Bedford.

Horisme obscurata **gaudata** subsp. n.

In the nominate subspecies the wings of the male are a mixture of bister and fuscous, presenting a uniformly dun appearance; in the female the costa, from base to the postmedial fascia, the posterior half of the medial area on the fore wing and the proximal half of the hind wing as far as the postmedial fascia, are suffused with fuscous. The other parts of both wings are cinnamon. In subspecies *gaudata* both sexes are coloured as in the female of the nominate subspecies

In the male genitalia of both subspecies there is a strongly sclerotised ridge on the basal half of the distal margin of the valve. In *o. obscurata* the basal half of the sclerotised ridge is twice as broad as the apical half, which is tapered apicad. In *o. gaudata* the basal half is one-half as broad as the distal half, which is truncate apicad. No differences have so far been noted in the genitalia of the females.

Holotype ♂, Angola: Mt. Moco, Luimbale, 18–1900 m., 16.iii.1934 (*Dr. K. Jordan*).

Paratypes: 13 ♂, type locality; 1 ♂, N. Rhodesia: Fort Jameson; 1 ♀, Mbeika; 1 ♀, Tanganyika Territory: Mbeya; 3 ♂, 1 ♀, Kenya: Kitale; 1 ♂, 1 ♀, Hoey's Bridge.

Eupithecia oculata sp. n. (Pl. II, fig. 11; Pl. VI, figs. 46, 52.)

♂ ♀ 20–22 mm. Ciliations of male antennae equal to two-thirds of the diameter of the shaft; female antennae filiform. Palpus and frons fuscous mixed with cinnamon. Head, thorax and abdomen cartridge buff irrorate with fuscous; a slender line of cartridge buff extends along the dorsum of the abdomen. Fore wing snuff brown, the medial fascia and the subterminal area irrorate with fuscous. Subterminal fascia white and broken, represented by white scales on the veins. Cell spot fuscous black ringed with white. Anal and distal margins of hind wing snuff brown irrorate with fuscous; remainder of hind wing paler coloured, with a minute fuscous cell spot. Underside: Distal half of the costa and the veins on the subterminal area of the fore wing cinnamon buff; remainder of the fore wing and the whole of the hind wing pale fuscous, the transverse fasciae and cell spots more strongly marked.

Closely related to the species identified in the British Museum as *Eupithecia kibatiata* Debauche (1938). In the male genitalia the eighth sternum is long and slender, as shown in the figure. In the female genitalia the genital plate is more than twice as long as broad, the central part being more strongly sclerotised. The membranous ductus bursae is equal in length to the genital plate and the bursa copulatrix is shaped and spined as shown in the figure.

Holotype ♂, Allotype ♀ and 2 ♀ Paratypes, Mt. Cameroon: Musake, 6350 ft., i.1932 (*M. Steele*).

Eupithecia albimaculata sp. n. (Pl. II, fig. 12 ; Pl. VI, fig. 53.)

♂ ♀ 17–20 mm. Ciliations of male antennae equal in length to the diameter of the shaft ; female antennae filiform. Palpus, frons, head, thorax and abdomen cartridge buff irrorate with fuscous ; patagia cartridge buff. Fore wing irrorate with snuff brown, lightly at midwing, strongly at margins. Transverse fasciae snuff brown, well marked at the costa, then principally on the veins. Subterminal fascia white. Termen fuscous interrupted by dots of cartridge buff on the veins. Hind wing cartridge buff lightly suffused with snuff brown ; the anal and distal margins more strongly irrorate with the same colour, especially on the veins. Cell spots snuff brown, sometimes wanting on the fore wing. Fringes on both wings cartridge buff divided by a slender fascia of snuff brown. Underside : Proximal half of fore wing, except costa, suffused with fuscous ; remainder of fore wing and the whole of the hind wing cartridge buff, the transverse fasciae marked in fuscous.

The species is closely related to *regulosa* Warren (1902) and *perculsaria* Swinhoe (1904) and, as in those species, the genitalia of neither sex afford very much in the way of specific characters. The eighth sternum of the male, however, is quite different from those of the related species and is shaped as shown in the figure.

Holotype ♂ and Allotype ♀, Kenya : Mt. Elgon, viii–ix.1951 (*T. H. E. Jackson*).

Paratypes : 3 ♂, 4 ♀, type locality ; 1 ♂, 1 ♀ in the British Museum (Nat. Hist.), 1 ♂, 2 ♀ in the Coryndon Museum, Nairobi.

Eupithecia urbanata sp. n.

♂ 17–18 mm., ♀ 20 mm. Ciliations of male antennae equal in length to one-third of the diameter of the shaft ; female antennae filiform. Palpus, frons, head, thorax and abdomen cartridge buff irrorate with snuff brown. Fore wing very smooth-scaled, snuff brown lightly irrorate with white, except on the transverse fasciae, which are marked in a slightly deeper shade of snuff brown. Veins marked with fuscous. Cell spot minute, black. Hind wing cartridge buff, the anal and distal margins irrorate with fuscous. Cell spot wanting. Fringes of both wings a mixture of fuscous and white, divided by a slender white fascia. Underside : Costa and apical area of fore wing and the whole of hind wing cartridge buff irrorate with fuscous ; remainder of fore wing lightly and evenly suffused with snuff brown.

Closely related to *Eupithecia semipallida* Janse (1933), with which it occurs and with which the genitalia of both sexes appear to be identical. It differs, however, in the more rounded and less produced apex of the fore wing, the absence of strong fuscous or fuscous black marking on the costa of the fore wing and the darker anterior half of the hind wing.

Holotype ♂, Abyssinia : Harar, 23.iv.1939 (*R. E. Ellison*).

Allotype ♀, Abyssinia : Harar, 31.iii.1940 (*R. E. Ellison*).

Paratypes, 1 ♂, 4 ♀ in the British Museum, 2 ♀ in coll. R. E. Ellison, type locality.

Eupithecia zingiberiata sp. n. (Pl. II, fig. 15 ; Pl. VI, fig. 55.)

♂ 20–22 mm., ♀ 22–23 mm. Antennal ciliation and wing shape similar to that of *urbanata*, but rather larger than that species ; pattern also similar, but marked in ochraceous tawny. Cell spot on fore wing fuscous black. Fringes ochraceous tawny.

The eighth sternum in the male, which is bifid at the apex, affords the best structural character for separating *zingiberiata* from *semipallida* and *urbanata*, in each of which the apex of the eighth sternum is rounded.

Holotype ♂ and Allotype ♀, KENYA : Nairobi, v.1927 (*D. M. Hopkins*).

Paratypes : 1 ♂, 5 ♀, type locality ; 1 ♂ in the British Museum (Nat. Hist.), 1 ♂, 1 ♀ in the Coryndon Museum, Thika Road, near Nairobi, 1 ♂, Kilindini, Machakos Road.

Eupithecia undiculata **glaucata** subsp. n.

Differs from the nominate subspecies in the ground colour of the wings, which is buffy brown in place of snuff brown, the absence of the numerous white striae patterning the fore wing and the distal and anal margins of the hind wing. The ground colour of the wings is evenly irrorate with white, only forming striae in the subterminal area ; the overall appearance is a powdery glaucous grey as opposed to the dark brown of *u. undiculata* Prout (1932).

Holotype ♂ and Allotype ♀, KENYA : Karura Forest near Nairobi, vi.1951 (*E. C. G. Pinhey*).

Paratypes : 2 ♀ in the British Museum (Nat. Hist.), 6 ♂, 6 ♀, in the Coryndon Museum, type locality ; 4 ♀ in the British Museum, 6 ♂, 6 ♀, in the Coryndon Museum, Thika Road, near Nairobi, 3 ♂, 4 ♀, Nairobi.

Eupithecia vinaceata sp. n. (Pl. II, fig. 14 ; Pl. VI, figs. 51, 54.)

♂ ♀ 17–19 mm. Ciliations of male antennae equal in length to the diameter of the shaft ; those of the female equal to one-quarter. Palpus, collar, patagia and first abdominal segment drab, the scales tipped with cartridge buff. Frons, thorax and the remainder of the abdomen a mixture of snuff brown and vinaceous brown. Fore wing cartridge buff suffused with snuff brown and vinaceous brown, strongly along the costa and the postmedial fascia and in the subterminal area ; snuff brown predominates along the veins. Some fuscous scaling present on proximal part of wing, between subcostal vein and inner margin. Cell spot fuscous, strongly marked. Hind wing cartridge buff, the anal and distal margins irrorate with fuscous and vinaceous drab. Cell spot fuscous. Fringes of both wings long, fuscous proximad, paler distad, the scales tipped with cartridge buff. Underside of both wings suffused with fuscous, the transverse fasciae, terminal areas and cell spots, streak-like on the fore wing, more heavily marked in a deeper shade.

The genitalia of both sexes are very similar to those of *regulosa* Warren (1902), with which it occurs. The valves of the male structures afford the best characters for separating the two species ; in *regulosa* the distal margin is evenly curved from base to apex ; in *vinaceata* the basal half of the distal margin is sclerotised with a tongue-like projection at one-half, as shown in the figure. The eighth sternum is twice as broad in its posterior half as that of *regulosa*.

Holotype ♂ and Allotype ♀, KENYA : Mt. Elgon, xii.1950 (*T. H. E. Jackson*).

Paratypes : 9 ♀, type locality.

Eupithecia jacksoni sp. n. (Pl. II, figs. 13, 18 ; Pl. VI, figs. 47, 48.)

♂ ♀ 18–20 mm. Antennal ciliations of the male equal to one-half the diameter of the shaft ; those of the female minute. Palpus, frons, head and thorax fuscous ; patagia and first abdominal segment cartridge buff and drab ; remainder of abdomen a mixture of auburn and fuscous. Fore wing : Cell area cartridge buff, more or less irrorate with auburn ; rarely almost white. Terminal area snuff brown, interrupted by auburn-marked

veins and edged proximally by a broken subterminal fascia of cartridge buff. Remainder of wing suffused with auburn, the postmedial fascia being strongly emphasised. Cell spot fuscous. Hind wing cartridge buff, the anal margin and the distal margin posteriorly, irrorate with auburn and fuscous; the transverse fasciae, which are well marked at the anal margin, do not extend beyond midwing; cell spot fuscous, minute. Fringes of both wings fuscous divided by a slender, pale fascia. Underside of both wings a smoky fuscous, the cell spots and the transverse fasciae, especially at the costa of the fore wing, marked in a darker shade.

Genitalia.—Uncus membranous, supported by two slender Z-shaped, sclerotised rods; apex rounded. Distal margin of valve evenly curved to a rounded apex. Vesica with a flattened cornutus, one-half as long as the aedeagus, broad picad, tapered basad and slightly spiralled. The eighth sternum consists of two broad rods, fused basad, slightly bowed and incurved apicad. *Female:* Ductus bursae membranous; bursa copulatrix ovate and spined, as shown in figure, with the ductus seminalis arising posteriorly from the right side.

Similar in appearance to the preceding species but readily distinguishable by the pale cell area of the fore wing. Differs markedly in the structure of the uncus from any other African species of the genus.

Holotype ♂ and Allotype ♀, KENYA: Mt. Elgon, viii–ix.1951 (*T. H. E. Jackson*).

Paratypes: 6 ♂, 22 ♀, type locality; 1 ♀, S. W. UGANDA: Kigezi, Impenetrable Forest.

Eupithecia feliscaudata sp. n. (Pl. II, fig. 16; Pl. VI, figs. 49, 50.)

♂ 26 mm. Antenna black with a pair of white scales dorsad at the base of each segment; circumciliate, the cilia arising from all round the shaft, equal in length to its diameter. Palpus, frons and thorax fuscous mixed with white; collar white; patagia consisting of short fuscous and long white scales. Fore wing a mixture of white, cartridge buff and fuscous; the minute basal area, the broad sinuous antemedial fascia, the sinuous medial and postmedial fasciae are strongly marked in fuscous black, the latter two fasciae being broad at the costa but slender posterior of the upper median vein; apex fuscous black; subterminal fascia cartridge buff or white; cell spot faintly marked, fuscous; fringes chequered fuscous and white. Hind wing glossy, a pale fuscous with darker shading indicating three transverse fasciae of even width. Cell spot fuscous, minute. Underside pale smoke grey; the transverse fasciae are marked in fuscous, but on the fore wing are best marked at the costa, where they are broad and separated by some cartridge buff scaling. Subterminal fascia marked on fore wing in cartridge buff.

Genitalia.—Uncus tapered to a slender hook. Apex of valve narrowly rounded. Vesica with one broad cornutus, one half as long as the aedeagus, and several small tapered cornuti. Eighth sternum consists of two rods incurved and tapered apicad, as shown in figure.

Related to *E. tetraglena* Prout (1932) and *E. mecodaedala* Prout (1932) but distinguishable at once in the male by the remarkable circumciliate antennae.

Holotype ♂, TANGANYIKA: Mt. Kilimandjaro, Peter's Hut, 12,500 ft. 5.iii.1951 (*R. G. Tapley*).

Paratypes, 1 ♂, type locality; 1 ♂, Mt. Kilimandjaro (*R. P. Le Roy*).

Eupithecia petersi sp. n. (Pl. II, fig. 17.)

♀ 32 mm. Closely related to and superficially indistinguishable from *E. infectaria* Guenée and *E. immensa* Warren. The genitalia are, however, distinct.

Ductus bursae twice as long as broad, membranous. Bursa copulatrix similarly proportioned ; the anterior and posterior quarters membranous ; remainder lightly sclerotised and spined, as shown in the figure. The genitalia of the two related species were described in 1951 ; (Fletcher, 1951, *Ann. Mag. nat. Hist.* (12) **6** : 1026).

Holotype ♀, TANGANYIKA : Njombe, 26.vi.1952 (*W. Peters*).

ENNOMINAE.

Xenimpia albicaput sp. n. (Pl. I, figs. 6, 10.)

♂ 30–35 mm., ♀ 33–34 mm. Antennae in the male pectinate to five-sixths of the shaft ; the longest pectinations at mid-shaft equal in length to the diameter of the eye ; female antennae filiform. Palpus and frons maize yellow suffused in part with cinnamon or snuff brown. Head and patagia white. Thorax and abdomen white mixed with cartridge buff. Wings pinkish buff suffused with cinnamon buff and light vinaceous fawn, the latter colour being especially strong in the subterminal area of both wings. On the fore wing the slender antemedial fascia is acutely angled on the subcostal vein. The postmedial fascia is acutely angled on vein *M*1 ; at the costa and from vein *Cu*2 to the inner margin it is broad, the latter part being surrounded by much white scaling ; elsewhere it is slender and sometimes wanting. The subterminal fascia, acutely angled on vein *M*1, is represented by a row of fuscous spots, strong on veins *M*1–*M*3 but failing towards the inner margin. Cell spot wanting. Hind wing with ante- and postmedial fasciae snuff brown and dentate, the latter being often represented by dots on the veins. A strong, snuff brown fascia extends straight from apex to anal angle. Cell spot a faint snuff brown streak ringed with buff scaling. Underside : Proximal three-quarters of both wings maize yellow mottled with cinnamon ; middle of inner margin of fore wing and cell area of hind wing with much white scaling. Ante- and postmedial fasciae on fore wing broadly marked at costa and inner margin, fuscous. Subterminal area of both wings light vinaceous fawn.

Female : Proximal half of each wing, from base to the postmedial fascia, which is straight from the subcostal vein to the inner margin, white irrorate with drab ; distal half of each wing drab with some cinnamon suffusion proximally near costa. Subterminal fascia marked on the fore wing only, represented by three fuscous spots, one at the costa, one between veins *R*5 and *M*1 and one between *M*1 and *M*2. Underside similarly patterned, but the area proximad of the subterminal fascia is strongly suffused with cinnamon.

Closely related to *X. chalepa* Prout (1915) ; distinguished from it in the male by the fascia on the hind wing which extends straight from the apex to the anal angle and in the female by its larger size and almost uniformly drab distal half of the fore wing.

Holotype ♂, S. CAMEROON : Bitje, 2000 ft. (*G. L. Bates*).

Allotype ♀, CAMEROONS : Bitje, Ja River, x–xi.1913, wet season.

Paratypes : 1 ♂, IVORY COAST : Bingerville ; 1 ♂, GOLD COAST : Coomassie ; 1 ♀, S. NIGERIA : Olokemeji ; 1 ♂, 1 ♀, CAMEROONS : Bitje ; 3 ♂, ANGOLA : Quicolungo ; 1 ♂, UGANDA : Masaka ; 1 ♂ in the Coryndon Museum, Kalinzu.

Zamarada pinheyi sp. n. (Pl. I, fig. 7.)

♂ ♀ 34 mm. Antennae bipectinate to three-quarters of shaft in the male, the longest pectinations one and a quarter times the diameter of the eye ; to just over one-half in the female, the longest pectinations one-half as long as the diameter of the eye. Palpus, frons and head tawny. Thorax and abdomen pinkish buff suffused dorsad with vinaceous drab, the abdomen more strongly. Costa of fore wing maize yellow posteriorly, vinaceous drab anteriorly. Both wings, proximad of the subterminal fasciae, which are snuff brown edged

proximally with maize yellow, are hyaline with minute black cell spots. The terminal bands are cinnamon suffused with vinaceous drab proximally and, except for the apical area of the fore wing, are exceptionally slender ; in this respect the species differs from all other known African species in the genus. Fringes cinnamon. Underside similarly marked, but the terminal bands of both wings are fuscous, except at midwing where they are cinnamon.

Holotype ♂ and Allotype ♀, TANGANYIKA : Amani, E. Usambara Mts., ii.1953 (*E. C. G. Pinhey*).

PLATE I.

FIG. 1. *Pulchralata fowleri* sp. n., ♂.
2. *Mirifica variata* sp. n., ♂.
3. *Sterrha townsendi* sp. n., ♀.
4. *Cancellalata subumbrata* sp. n. ♂.
5. *Piercia jacksoni* sp. n., ♀.
6. *Xenimpia albicaput* sp. n., ♂.
7. *Zamarada pinheyi* sp. n., ♂.
8. *Horisme longispicata* sp. n. ♀.
9. *Collix muscosata* sp. n. ♂.
10. *Xenimpia albicaput* sp. n., ♀.

New species of African Geometridae.

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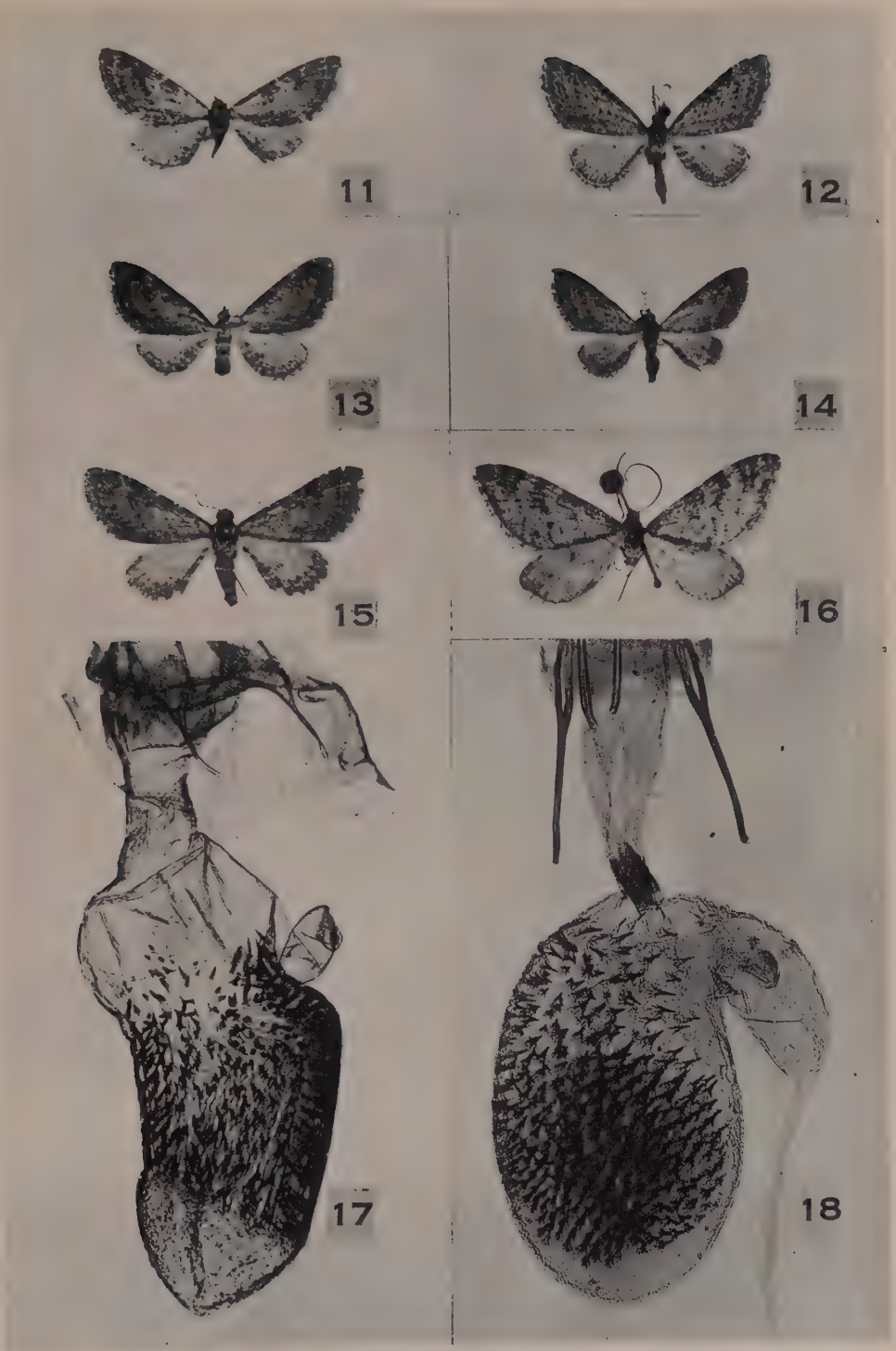
PLATE II.

Fig. 11. *Eupithecia oculata* sp. n., ♀.
12. ,, *albimaculata* sp. n., ♀.
13. ,, *jacksoni* sp. n. ♀.
14. ,, *vinaceata* sp. n., ♀.
15. ,, *zingiberiata* sp. n. ♀.
16. ,, *feliscaudata* sp. n. ♂.
17. ,, *petersi* sp. n. Female genitalia.
18. *Eupithecia jacksoni* sp. n. Female genitalia.



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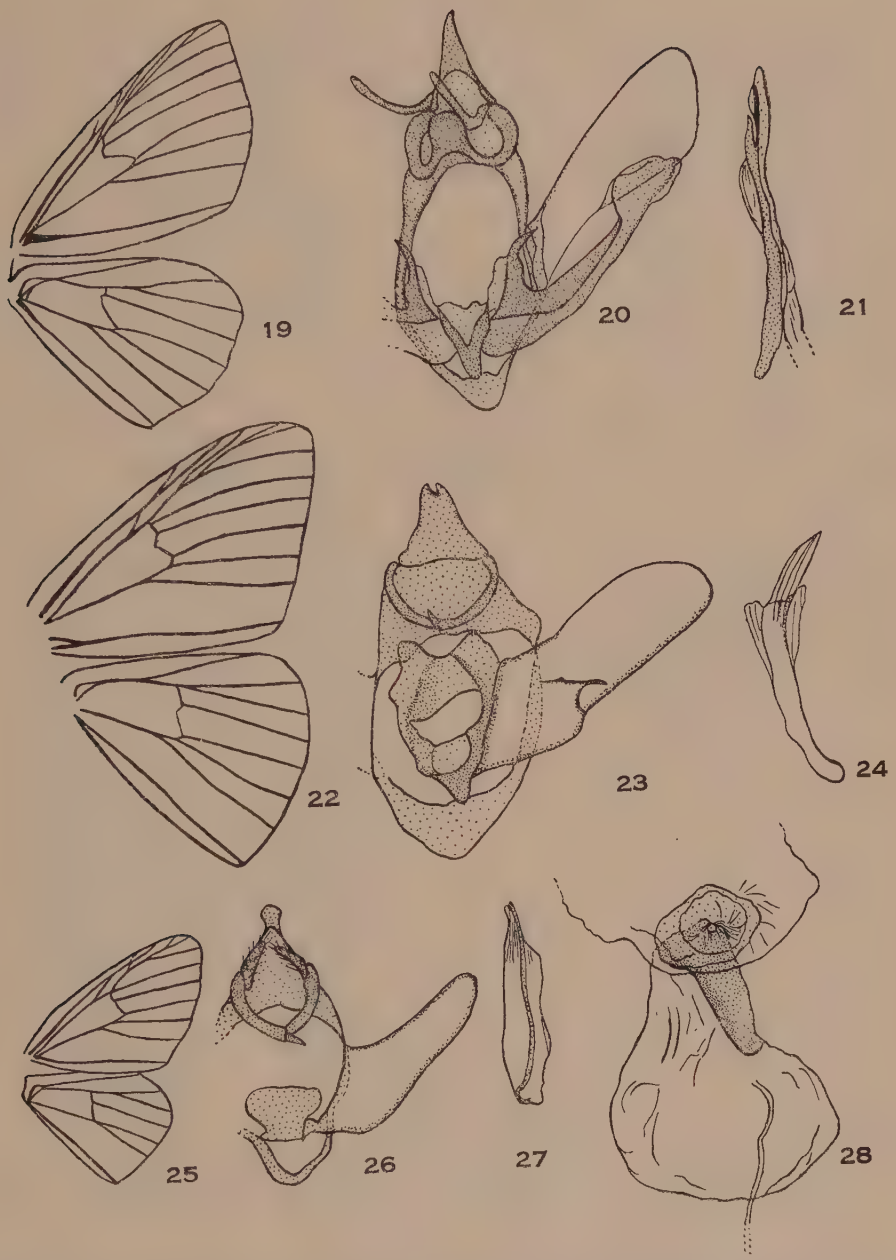
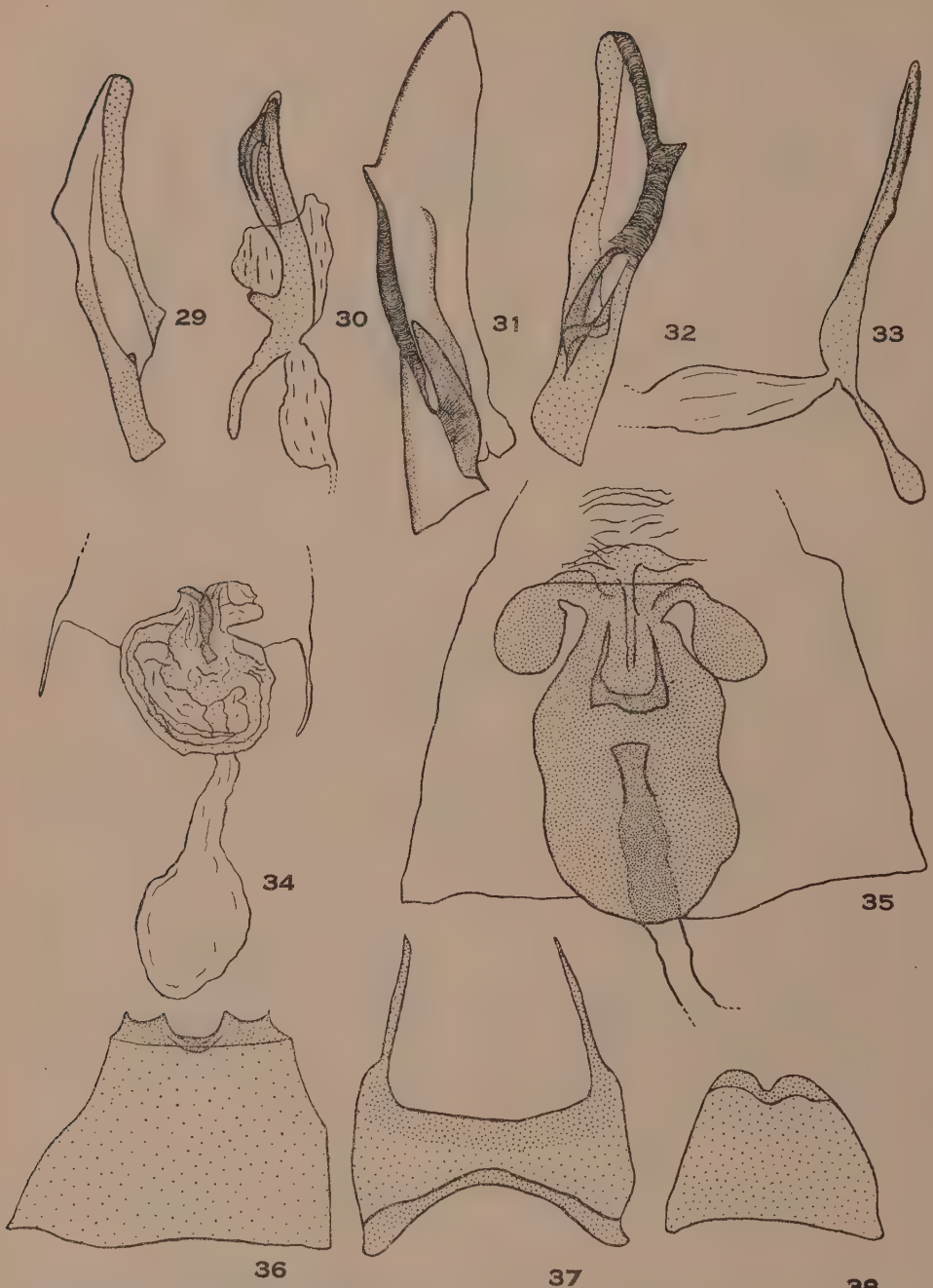
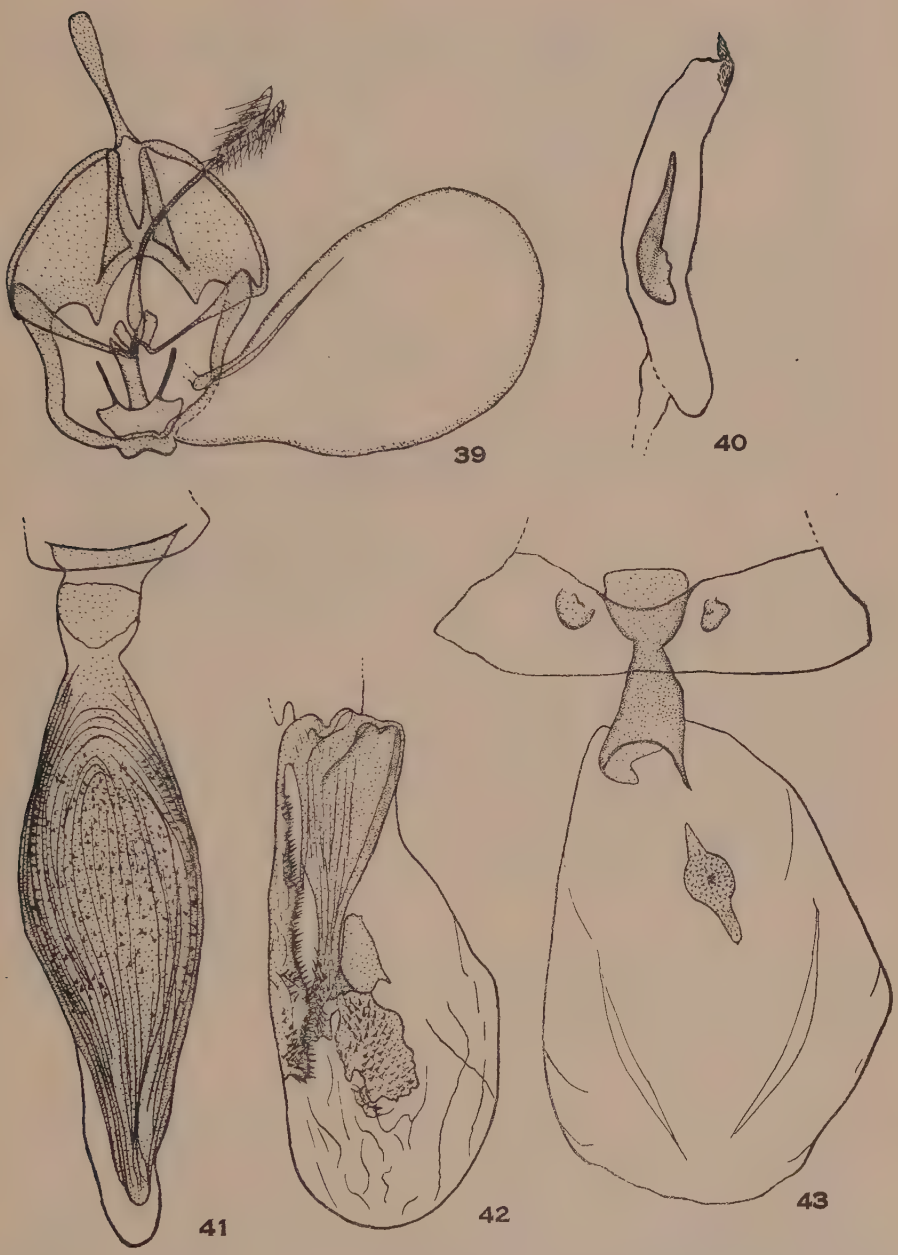


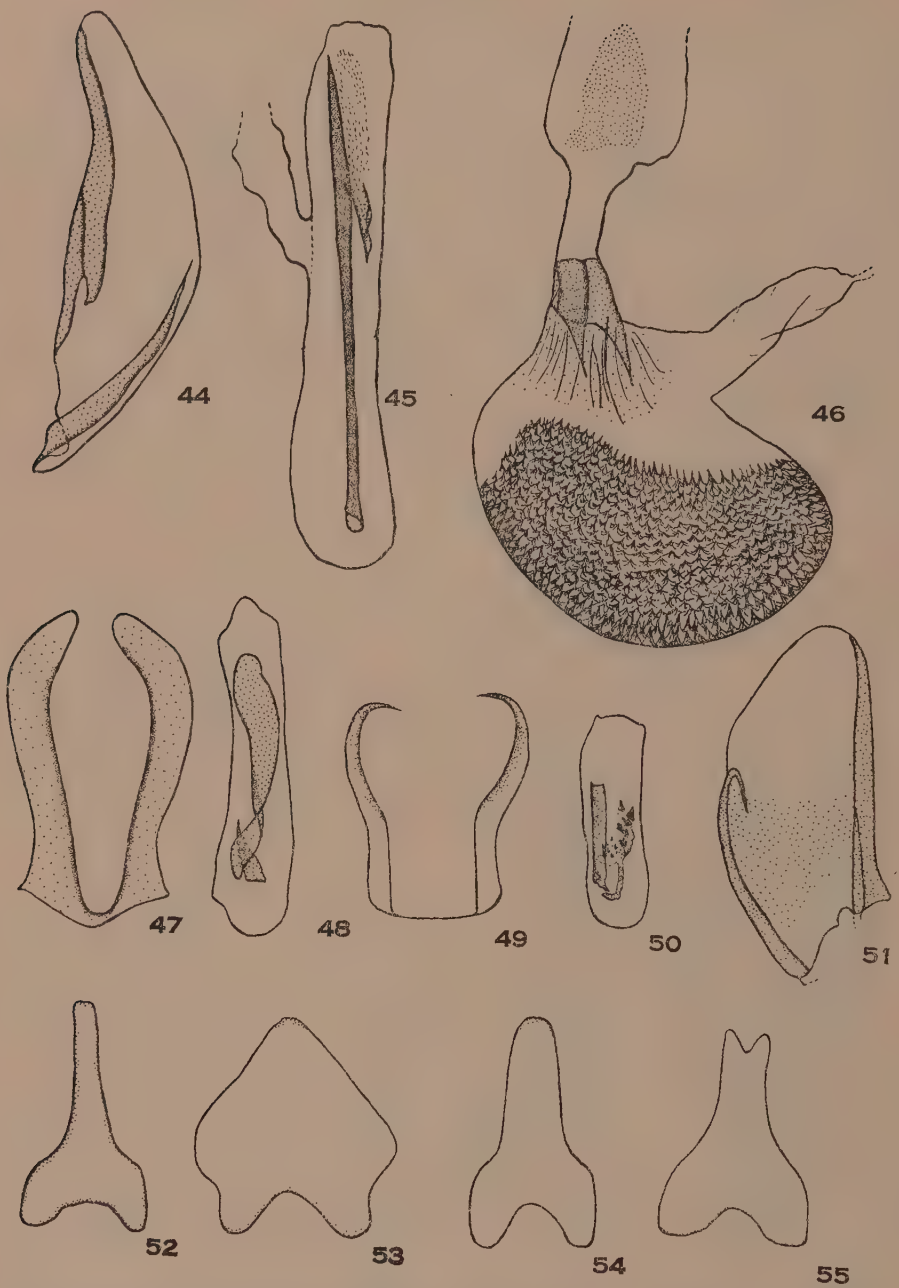
FIGS. 19–28.—(19–21), *Mirifica variata* sp. n. (19) Neuration. (20) Valve. (21) Aedeagus. (22–24) *Pulchralata fowleri* sp. n. (22) Neuration. (23) Valve. (24) Aedeagus. (25–28) *Cancellalata subumbrata* sp. n. (25) Neuration. (26) Valve. (27) Aedeagus. (28) Female genitalia.



FIGS. 29–38.—(29) *Prasinocyma pumilata* sp. n. Valve. (30) *P. pumilata*. Aedeagus. (31) *P. simiaria* Prout. Valve. (32) *P. pedicata* sp. n. Valve. (33) *P. pedicata*. Aedeagus. (34) *P. pumilata*. Female genitalia. (35) *P. pedicata*. Genital plate. (36) *P. simiaria*. Eighth sternum. (37) *P. pedicata*. Eighth sternum. (38) *P. pumilata*. Eighth sternum.



FIGS. 39–43.—(39) *Collix muscosata* sp. n. Valve. (40) *C. muscosata*. Aedeagus. (41) *Horisme longispicata* sp. n. Female genitalia. (42) *Sterrha townsendi* sp. n. Female genitalia. (43) *Piercia jacksoni* sp. n. Female genitalia.



FIGS. 44-55.—(44) *Horisme longispicata* sp. n. Valve. (45) *H. longispicata*. Aedeagus. (46) *Eupithecia oculata* sp. n. Female genitalia. (47) *E. jacksoni* sp. n. Eighth sternum. (48) *E. jacksoni*. Aedeagus. (49) *E. feliscaudata* sp. n. Eighth sternum. (50) *E. feliscaudata*. Aedeagus. (51) *E. vinaceata* sp. n. Valve. (52) *E. oculata* sp. n. Eighth sternum. (53) *E. albimaculata* sp. n. Eighth sternum. (54) *E. vinaceata* sp. n. Eighth sternum. (55) *E. zingiberiata* sp. n. Eighth sternum.

ANOTHER NEW SPECIES OF *CONCHASPIS* COCKERELL (HEMIPTERA: COCCOIDEA) FROM MADAGASCAR.

By J. Raymond Mamet, F.R.E.S.

(*Rose Hill, Mauritius.*)

I wish to tender my thanks to Dr. R. Paulian, Directeur-Adjoint de l'Institut Scientifique de Madagascar, who kindly forwarded to me for study the species here described.

Conchaspis didiereae sp. n. (Fig. 1.)

Habit.—Occurring on stems of host.

Scale of female roughly circular, flat, light cream to light buff in colour, of felted texture, sometimes occurring singly or in masses under the epidermis of the host. Central boss fairly conspicuous, flat. Internally the scale is pure white but not nacreous. Diameter of scale, about 3 mm.

Scale of male elongate, very thin, white and shiny; central boss thicker than rest of scale; occurring in small number under female mother scale.

Recognition characters.—Adult female of the shape common to the genus, with prosoma swollen; derm sclerotised, very coarsely stippled. Antennae with segmentation obscure, terminal segment with three long, stout and broad sensory setae and two long, stout, ordinary setae. Dorsal ocellar spots large, represented as elongate-oval or elliptical discs, the derm of which being differently stippled from that of the surroundings, with an irregularly elongate and more strongly sclerotised small spot centrally; both ocellar spots anteriorly bordered by a yoke-like, broad, sclerotised band which extends posteriorly on both sides of the ocellar spots externally but which does not enclose the spots posteriorly. Prothoracic tubercle markedly developed. A series of about 75 to 90 long, slender, ventral setae scattered in the marginal and submarginal areas of the head, this series originating anteriorly to the antennal bases and extending forwards but interrupted medially on the frons. Length, about 1·8 mm.

Dorsal tubular ducts absent.

Ventral multilocular pores absent.

Metathoracic dermal invaginations small, well-sclerotised. A pair of small, pore-like structures surrounded by a well-sclerotised margin on the mesothorax ventrally and submedially. Marginal body setae well-developed and fairly numerous on the margin of the thoracic segments.

Type and paratypes, Madagascar: Tuléar, vi.1951 (*R. Paulian*, Nos. 421 and 423). Taken from *Didierea mirabilis* Baill.

Notes.—This species differs from all the known species of the genus by the complete absence of dorsal tubular ducts and ventral multilocular pores and by the occurrence of numerous ventral setae in the marginal and submarginal areas of the head.

The discovery of a species of *Conchaspis* on a plant of the genus *Didierea*, which is so far known to occur only in Madagascar, is of importance; its full significance will be known when the geographical distribution of the genus

Conchaspis can be discussed at a later stage of our knowledge of the Conchaspididae.

Conchaspis didiereae is the eighth species of this genus to be recorded from Madagascar.

The type and paratypes are in the author's collection. A paratype has been deposited in the collection of the Institut de Recherche Scientifique de Madagascar.

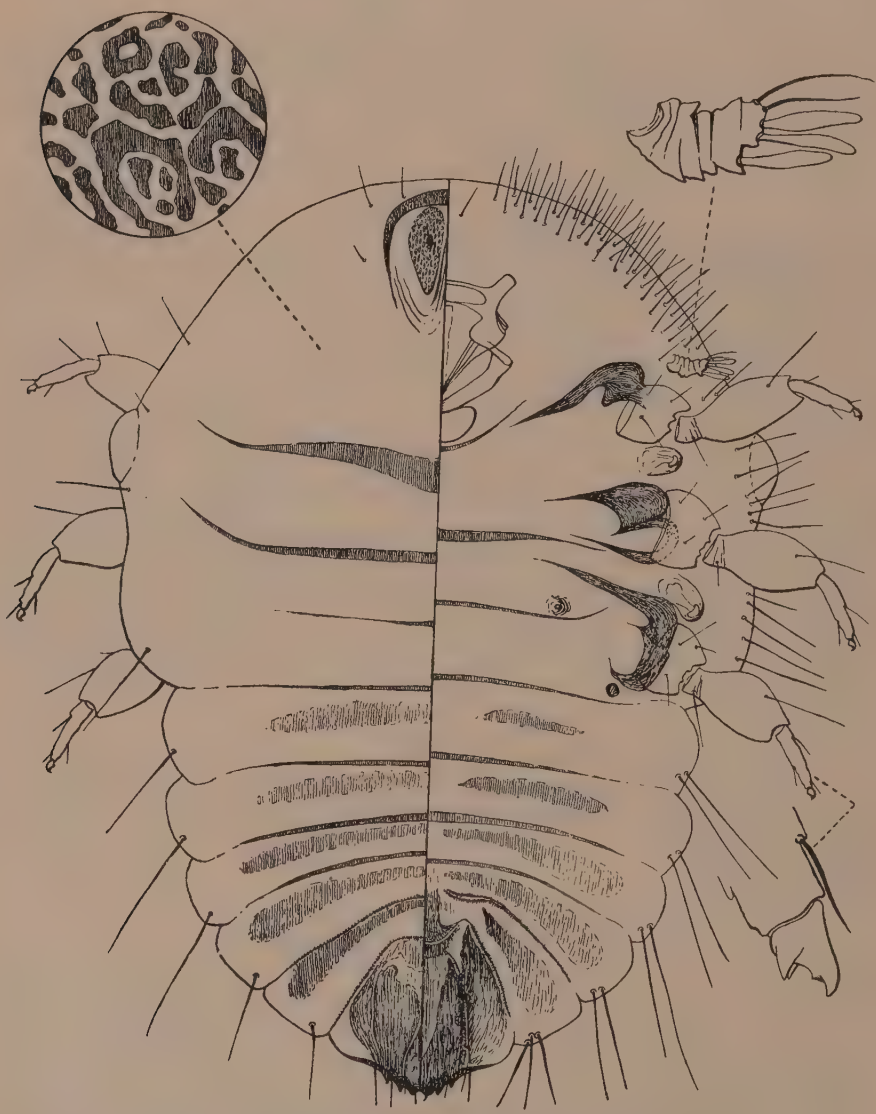


FIG. 1.—*Conchaspis didiereae* sp. n. Adult female.

THE GENUS *PHONOCHORION* UVAROV (ORTHOPTERA: TETTIGONIIDAE).

By T. Karabag, F.R.E.S.

(*Zoological Institute, Ankara, Turkey.*)

The genus *Phonochorion* was established by Uvarov in 1916 for a single species, *Ph. satunini*, and Bey-Bienko in 1954 described the second, *Ph. artvinensis*. A very distinct new species of this genus was found by me amongst the excellent collection of Orthoptera made by Dr. P. Davis in Turkey in 1952, and it is described below.

The males in this genus, which is related to *Poecilimon*, have a remarkably specialised pronotum, with the large metazona raised almost vertically; moreover the mesonotum, metatonum and the first tergite are provided with strongly chitinised transverse ridges and cavities, the whole complex of these structures, apparently, serving as a resounding apparatus. In addition, these ridges bear, on their middle, dense tufts of hair, which represent the alluring, or Hancock's, glands of a highly specialised kind. Even in dry specimens of the new species (and of *Ph. satunini* Uv.), these hairy tufts were found full of sticky secretion.

The resounding apparatus in *Phonochorion* of this type is unique amongst Phaneropterinae, while the alluring glands previously known in the subfamily are very much simpler in their structure (*Poecilimon ampliatus* Krauss, 1878, *Sitzb. Akad. wiss. Wien. Mat.-nat. Cl.* **78**: 48, pl. iii, fig. 31; *Isophya acuminata* Boldyrev, 1915, *Horae Soc. ent. Ross.* **41** (6): 94; *Poecilimon glandifer* Karabag, 1950, *Proc. R. ent. Soc. Lond.* (B) **19**: 150, figs. 5–13; *Barbitistes constrictus* Haber, 1953, *Roczn. Nauk. Lesn. Warsaw*, **1**: 76, fig. 5).

It would be most interesting to study the courtship and stridulation of these remarkable insects.

1. *Phonochorion satunini* Uvarov. (Figs. 1–10.)

1916, *Phonochroion satunini* Uvarov, *Bull. Mus. Caucas.* **10**: 78.
1954, *Phonochorion satunini* Uvarov, Bei Bienko, *Fauna S.S.S.R. Orthoptera*, II (2): 366.

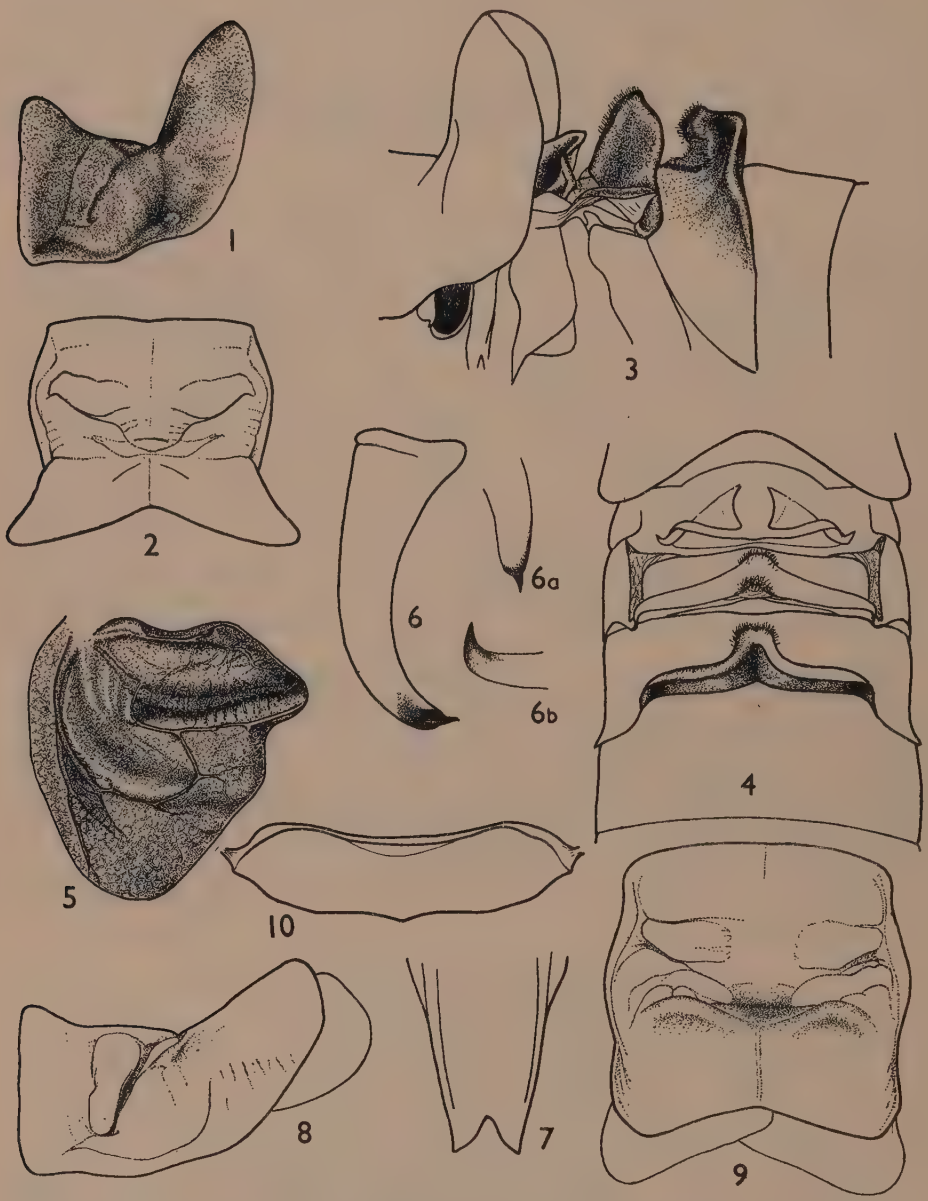
S.W. Georgia: Jugum Adzharicum; Bakhmaro, Jurian Mts., 1839 m.

I studied specimens of undoubtedly the same species collected by Dr. P. Davis in the Pontian Taurus, Prov. Rize, distr. Ikizdere, Tatos dag: nr. Baskoy, 2200 m., 28.viii.1952, 5 ♂, 5 ♀; above Cimil 2500 m., 27.viii.1952. 1 ♀; Yetimhoca, 2100 m., 27.viii.1952 3♀ (*P. H. Davis*).

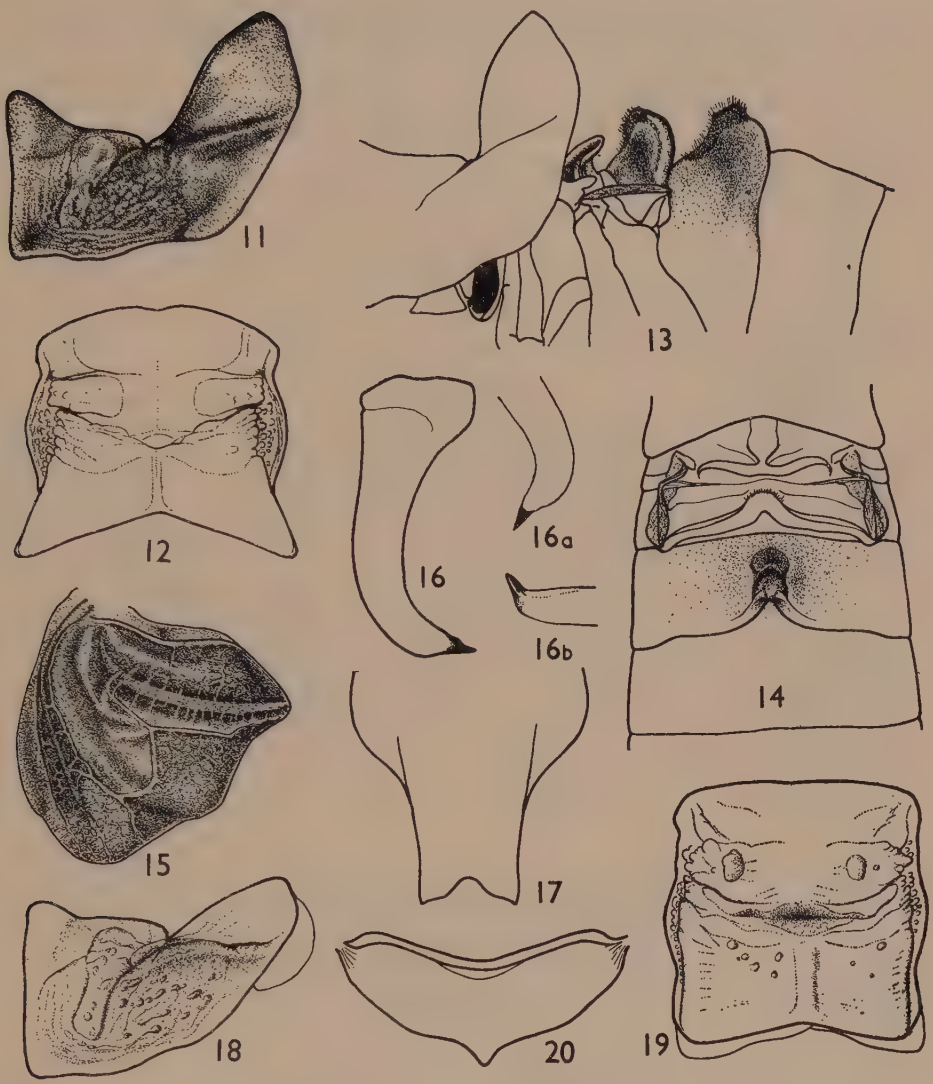
2. *Phonochorion artvinensis* Bei-Bienko.

1954, *Phonochorion artvinensis* Bei-Bienko, *Fauna S.S.S.R., Orthoptera*, II (2): 365, 367.

N.W. Turkey: Choruh province, Otuza porta, 1–2.viii.1909, Yalanis-cham. Known to me only from the description.



FIGS. 1–10.—*Phonochorion satunini* Uvarov. (1) ♂, Pronotum in profile; (2) ♂, pronotum from above; (3) ♂, pronotum, mesonotum, metanotum, first and second tergites in profile; (4) ♂, pronotum (posterior edge), mesonotum, metanotum, first and second tergites from above; (5) ♂, left elytron; (6) ♂, left cercus from above; (6*a*) ♂ end part of left cercus from below; (6*b*) ♂, end part of left cercus from inside; (7) ♂, end part of subgenital plate; (8) ♀, pronotum and elytra in profile; (9) ♀, pronotum and elytra from above; (10) ♀, subgenital plate.



FIGS. 11–20.—*Phonochorion uvarovi* sp. n. (11) ♂, pronotum in profile; (12) ♂, pronotum from above; (13) ♂, pronotum, mesonotum, metanotum, first and second tergites in profile; (14) ♂, pronotum (posterior edge), mesonotum, metanotum, first and second tergites from above; (15) ♂, left elytron; (16) ♂, left cercus from above; (16*a*) ♂, end part of left cercus from below; (16*b*) ♂, end part of left cercus from inside; (17) ♂, end part of subgenital plate; (18) ♀, pronotum and elytra in profile (19) ♀, pronotum and elytra from above; (20) ♀, subgenital plate.

3. **Phonochorion uvarovi** sp. n. (Figs. 11–20.)

Male (type).—Somewhat smaller than the other two species. Head small; fastigium of vertex widened to apex and rounded, narrower than the first antennal segment, with a deep and wide furrow.

Pronotum with prozona concave in profile ; metazona raised almost vertically (fig. 11) ; median carina developed on metazona ; lateral carinae at meso- and metazona well developed; mesozona rather rough above, laterally pro- and mesozona very rough with first furrow distinct and median furrow deep (figs. 11–12).

Mesonotum raised transversely in the middle ; metanotum also strongly raised with a tuft of short hair in the middle (figs. 13, 14).

Elytra (fig. 15) extend to the end of first tergite.

First tergite raised strongly in the middle, but this ridge is shorter than that on the metanotum and it carries a larger tuft of hair (figs. 13, 14) ; second tergite widely convex in the middle. Cercus simple, gradually bent inward, with a black tooth at apex (figs. 16, 16*a*, 16*b*). Subgenital plate long, narrowed to apex, which has a deep and rounded excision with sinuate sides (fig. 7).

General coloration black. The following parts are yellow or reddish-yellow : rings on antennae, face, sides of occiput, parts of prozona and mesozona, two large areas of metazona divided by black median carina, sides of metazona below the lateral carina ; most of the elytra ; lower and inner sides of posterior femora ; narrow transverse bands along posterior edges of tergites (except the last) ; ventral surface and subgenital plate. First femur with black spot on upper surface of the base ; upper edge of middle femur with a black streak ; upper margin of tympanal area black.

Female.—Head larger than in male ; fastigium of vertex narrower than the first antennal segment, with a deep and long furrow. Pronotum (figs. 18, 19) wider than in male ; prozona weakly concave in profile ; transversal furrow deep ; posterior margin weakly concave ; median carina in metazona very distinct ; lateral carinae well developed in metazona, almost parallel ; surface mostly rough. Elytra extend to the end of metanotum, only a very small part being visible from above. Subgenital plate transverse, short, with a small apical lobe (fig. 20). Ovipositor much longer than head and pronotum together, almost straight, curved upwards near the apex.

General coloration : some individuals are coloured as male, others are uniformly reddish-green.

Measurements : total length, ♂ 25·3 (type) to 27·1, ♀ 24·1–28·1 mm.; pronotum ♂ 5–5·8 (type), ♀ 5·9–6·6 mm.; visible part of elytra ♂ 4·4–4·6 (type) to 5 mm.; whole elytron ♂ 5·9 mm.; hind femur ♂ 18·1 (type) to 19·7, ♀ 18·5–20·8 mm.; ovipositor ♀ 11·2–12·2 mm.

Pontian Taurus: Rize province, distr. Ikezdere, Tatos dag : above Cimil, 2500 m., 27.viii.1952 3♂ (including type), 2♀ ; Pazar below as-Hemsin, 2000 m. in dry meadows and pasture, 2.ix.1952, 3♂, 3♀ (*P. H. Davis*).

I have much pleasure in dedicating this new species to Dr. B. P. Uvarov, the author of this interesting genus.

This species differs from *Ph. satunini* Uvarov, together with which it was found, by the presence of lateral carinae and rough surface of pronotum ; the shape of elytra ; the shape of raised parts of meso- and metanotum and first tergite ; the structure of subgenital plate in both sexes : These differences can be seen by comparing figs. 1–10 with figs. 11–20. The first figures are drawn from specimens of *Ph. satunini* collected by P. H. Davis from Tatos dag, Province Rize, distr. Ikizdere.

Types and paratypes deposited in the British Museum (Natural History).

A NEW SPECIES OF EMESINAE (HEMIPTERA-HETEROPTERA: REDUVIIDAE).

By N. C. E. Miller, F.R.E.S., F.E.S.S.A.

(*Commonwealth Institute of Entomology, London*)

Specimens of the new species described herein were found on the trunk of a tree in the Zika forest eight miles from Entebbe, Uganda, by Dr. J. D. Gillett, Virus Research Institute, East African High Commission, Entebbe.

Its habits will be described elsewhere by Dr. Gillett.

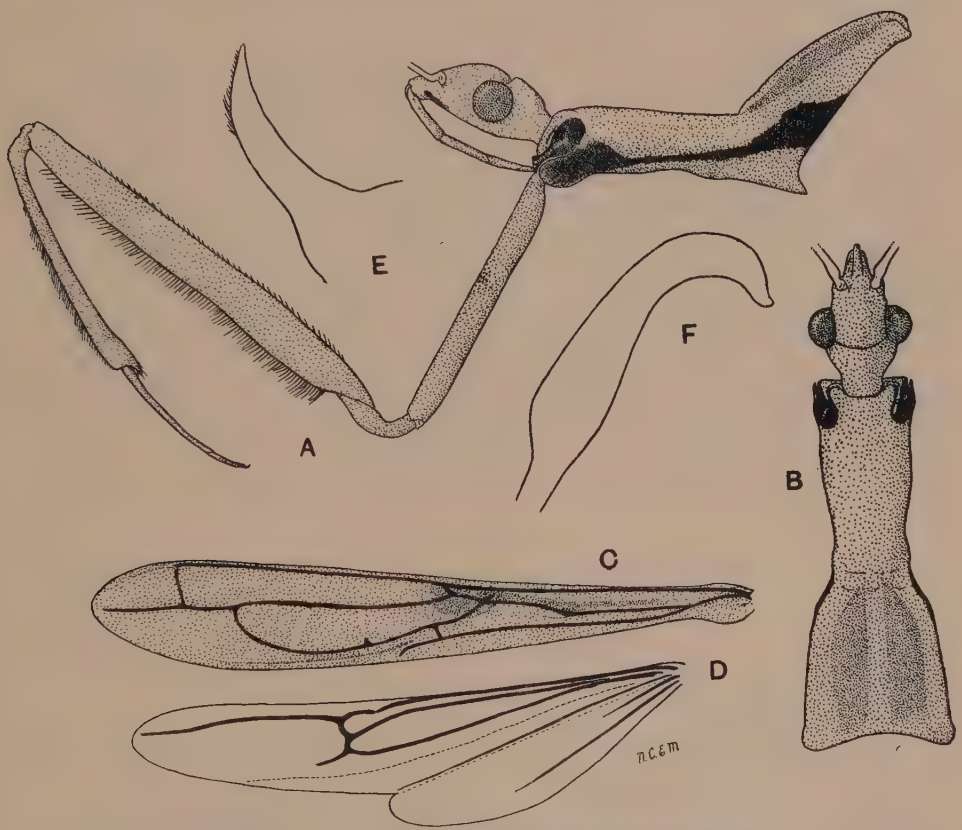


Fig. 1.—*Bagauda gilletti* sp. n. (A) Head, pronotum, anterior leg, lateral view. (B) Head and pronotum dorsal view. (C) Hemelytron. (D) Metathoracic wing. (E) Median apical process of pygophore. (F) Harpago.

Bagauda gilletti sp. n. (Fig. 1.)

Colour.—Pale testaceous. Antennae piceous; basal segment with faint testaceous suffusion basally. Head anteriorly, vertex and postocular laterally suffused with brown. Posterior lobe of pronotum with two triangular brownish spots. Anterior acetabula, except

posterior half, anteriorly suffused with piceous. Propleura with a narrow piceous stripe widening and becoming paler posteriorly ; meso- and metapleura piceous ; acetabula with testaceous suffusion. Abdomen ventro-laterally with narrow piceous suffusion. Anterior femora apically, anterior tibiae basally and apically suffused with piceous ; median and posterior femora apically whitish and with a sub-apical piceous annulation with the basal margin indistinct ; median and posterior tibiae basally whitish with a faint sub-basal piceous annulation. Corium with a faint, longitudinal infumate stripe between Cu and M connecting with an infumate spot at base of internal cell and an infumate suffusion along IA ; clavus and membrane faintly infumate ; membrane with a narrow piceous suffused stripe from IA along anal margin ; cross-veins in cell margined with white.

Structure.—Head somewhat less than five and a half times shorter than pronotum ; margins of postocular bisinuate. Posterior lobe of pronotum with postero-lateral angles rounded and feebly elevated ; posterior margin feebly concave. Scutellum with disc feebly depressed ; apex broadly rounded. Anterior tibiae obscurely serrate on inner surface.

	♂.	♀.
Total length	20·00 mm.	21·50 mm.
Hemelytra	13·50 mm.	14·00 mm.

Allied to *Bagauda gigantea* Lhoste (1939, *Bull. Mus. Hist. nat. Belg.* **15** : 3) from the French Congo and Gabon and to *B. creppei* Lhoste (*loc. cit*) from the Belgian Congo, but differs from both in coloration and in the relative lengths of the anterior and posterior lobes of the pronotum. It is somewhat larger than *B. creppei* and the anterior angles of the posterior pronotal lobe are less prominent.

One ♂ (holotype), 1 ♀ (paratype), UGANDA : Zika Forest, vi.1954 (*J. D. Gillett*).

The holotype and paratype have been presented to the British Museum (Natural History), London.

STUDIES IN DOLERINI (HYMENOPTERA : SYMPHYTA).

By Robert B. Benson, M.A., F.R.E.S.

(*British Museum (Natural History)*.)

I. The *DOLERUS* of Abisko in Swedish Lapland.

Malaise (1931) lists four species of *Dolerus* known from Swedish Lapland and occurring or presumed to occur in the Abisko National Park. These are what he calls *Dolerus bimaculatus* (Geoffroy), *D. pratensis* var. *arcticus* Thomson, *D. arcticola* Kiaer and *D. aeneus* Hartig. In his work on the Tenthredinidae of Sweden (1932) he revises this list by adding *D. gessneri* var. *labiosus* Konow and doubtfully excluding *D. bimaculatus*. Zhelochovtsev (1935) adds *D. pullulus* Zhelochovstev from specimens sent to him by Malaise.

In the summer of 1954 I collected representatives of seven species in the National Park at Abisko. This number includes all the five mentioned above (except *D. bimaculatus*) and two others, one of them undescribed.

I am much indebted to Dr. R. Lambert (Ottawa) and Dr. H. H. Ross (Illinois) for sending me representatives of several North American species, to Mr. Lindqvist (Helsingfors) for sending me material from Finland, Mr. K. Takeuchi (Kyoto) for sending me material from Japan and to Dr. Sachtleben of the Entomologisches Institut, Berlin, for lending me all the types of *Dolerus* in Konow's collection. I am also much indebted to the Swedish Academy of Sciences for allowing me to stay at the Abisko Naturvetenskapliga Station and to the Swedish Board of Crown Lands and Forests for allowing me to collect in the Abisko National Park.

Dolerus elderi Kincaid

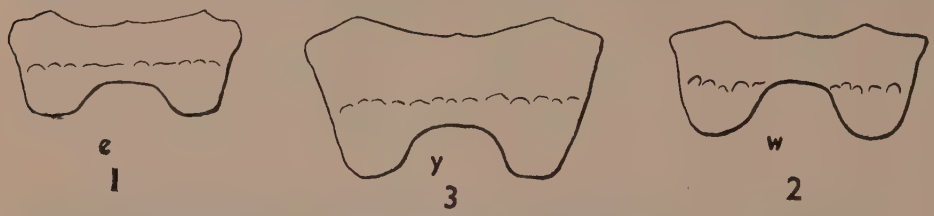
Dolerus pusillus Jakovlev, 1892, nec Latreille 1825, **syn. n.**
Dolerus elderi Kincaid, 1900.
Dolerus pullulus Zhelochovtsev 1928 and 1935, **syn. n.**

We found this species rather scarce at Abisko but widely distributed on *Equisetum* below and above the tree line, in company with a much commoner but undescribed species which we confused with it for some time. Comparison with specimens of *D. elderi* from N. America shows that the Palaearctic *D. pullulus* is the same species, which thus has a wide Holarctic distribution (N. Eurasia from Lapland to Kamtchatka, and in the mountains of C. Asia from Mongolia to Turkestan ; and in N. America from Alaska and the Rocky Mountains to Newfoundland and the middle Atlantic Coast). For the differences between this species and the new one that follows, see the discussion under that species.

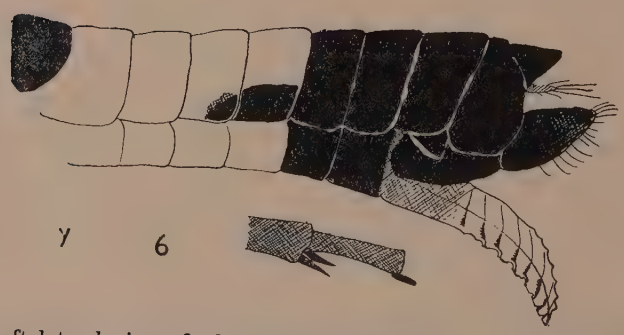
Dolerus willoughbyi sp. n.

Female.—Colour black except for the following, which are more or less yellow : labrum, tegulae, abdominal segments 2–3 or 4 and front and middle tibiae.

Head narrowed behind the eyes with the occipital furrows clearly indicated and subcarinate behind ; clypeus deeply excised in front to a depth of at least half the total depth of the clypeus (fig. 2) ; antenna about twice as long as the width of the head behind the eyes, segment 8 being about three times as long as broad ; punctation dense except on the temples



FIGS. 1–3.—Clypeus of : (1) *Dolerus elderi* ; (2) *D. willoughbyi* ; (3) *D. yukonensis.*

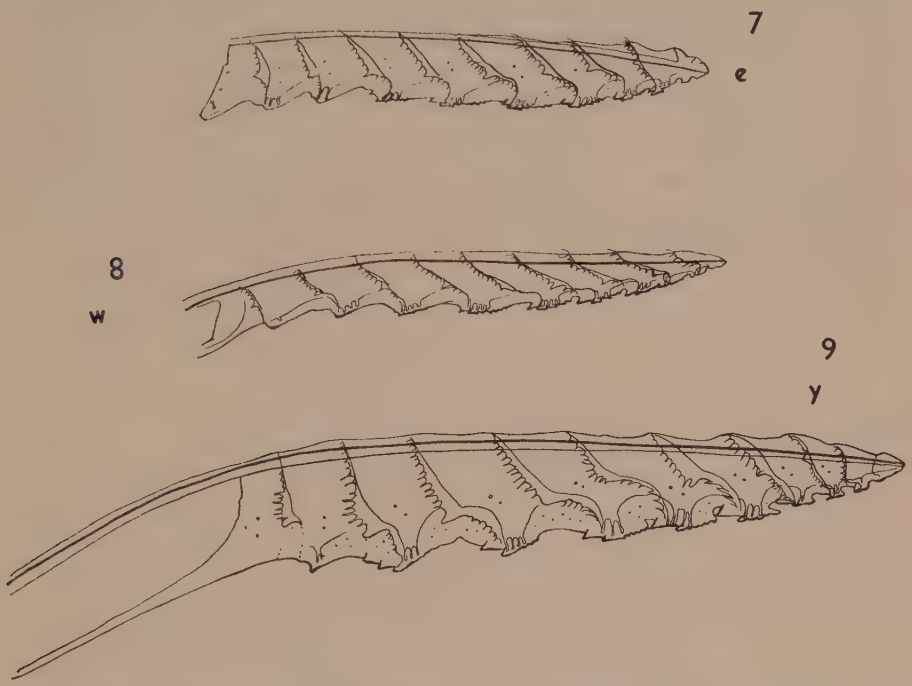


FIGS. 4–6.—Left lateral view of abdomen to show average colour pattern, and size of saw compared to hind tibia and tarsus in : (4) *D. elderi* ; (5) *D. willoughbyi* ; (6) *D. yukonensis.*

each side of the postoccelar area and the outer orbits, where there are impunctate areas more or less developed.

Thorax : mesonotal lobes with small clearly defined punctures, dense at the sides but sparse and unevenly spaced in the middle, where there are shining interspaces, larger than the diameter of a single puncture ; mesoscutellum likewise densely punctured at sides and behind but with shining interspaces in the front and in the middle, with its post-tergite medially carinate and the sides with fine surface sculpture ; mesopleura with large honeycomb punctation above and shining between fine sparse punctures and hair-follicles below.

Legs with slender tarsi (as in *Loderus*), the hind basitarsus being about five times longer than broad and longer than the two following tarsal segments together ; hind tibial spurs about as long as the apical breadth of the tibia.



Figs. 7–9.—Saw of : (7) *D. elderi* ; (8) *D. willoughbyi* ; (9) *D. yukonensis.*

Wings normal, hyaline ; stigma and venation black.

Abdomen impunctate and glabrous above ; with fine pubescence apically and below. Sawsheath as in *D. yukonensis* Norton (see Benson 1952, fig. 182) ; saw (fig. 8) very small so that its breadth, together with that of the saw-support, is less than the apical breadth of the hind tibia (fig. 5).

Male.—As female except for the apical segments ; penis valve fig. 11.

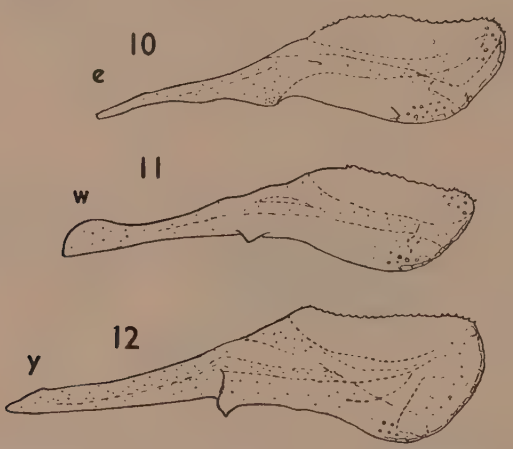
Length : ♂ 5·5 to 6·5 mm.; ♀ 6 to 7·5 mm.

North Sweden, Torne Lapmark: Abisko, 1 ♀, 4 ♂, 11–16.vi.1954, 3 ♀, 16 ♂, 17–22.vi.54, 9 ♀, 2 ♂, 25–30.vi.54, 3 ♀ 1–5.vii.54, 2 ♀ (including holotype) 9–19.vii.54 ; Abisko, Mt. Nuolja, 2000–3000 ft., 1 ♀, 8.vii.54 ; Björkliden, 4 ♀, 1 ♂, 8–9.vii.54 ; Riksgränsen, 3 ♀, 11–12.vii.54, (*J. E. and R. B. Benson*). (Holotype and paratypes in the British Museum, paratypes will also be deposited in the Naturhistoriska Riksmuseet, Stockholm.) North Norway : Mainland

East of Tromsø Hill, 1 ♀, 9.vi.1921, (*C. S. Elton*) (In the British Museum). North Finland : Inl. Utsjoki, Outakosti, 2 ♀, 2 ♂, 24–25.vi.1948 ; Enl. Kilpisjarvi, 1 ♀, 7.vii.50, 2 ♂, 8–9.vii.1954 (*E. Lindqvist*) ; Psl. Petsamo, Lullojoki, 1 ♀ (*Platonoff*) (In Lindqvist Collection). Total : 31 ♀, 30 ♂.

This species is intermediate in size between the preceding, *D. elderi* (5–6 mm.) and the following *D. yukonensis* (= *arcticola*) (6–9 mm.) in Lapland. The main characters for separating these three species are shown in figs. 1–12.

Both *elderi* and *yukonensis* have a much shallower emargination to the front margin of the clypeus (figs. 1–3), and a tendency for the lateral down-turned margins of the posterior yellow tergites to develop black marks, which in some specimens become a lateral black stripe ; this tendency is not seen in *willoughbyi* (*cf.* figs. 4–6). The saws of *elderi* and *willoughbyi* are at once distinguished from those of *yukonensis* by the small total breadth which, with its support, is not broader than the apical breadth of the hind tibia. The saw of *willoughbyi* is further distinguished from that of *elderi* by its narrower general form and the lesser development of the flanges bearing the lateral teeth (*cf.* figs. 7 and 8). The male penis valves are very similar but, apart from the general form which distinguishes *yukonensis* from the other two, there are differences in the arrangement of the dorsal teeth.



Figs. 10–12.—Penis valve in : (10) *D. elderi* ; (11) *D. willoughbyi* ; (12) *D. yukonensis*.

Dolerus yukonensis yukonensis Norton.

Dolerus similis var. *yukonensis* Norton, 1872.
Dolerus lateralis Konow, 1895, **syn. n.**
Dolerus articola Kiaer, 1898, **syn. n.**
Dolerus yukonensis Norton, Ross, 1929 : 74
Dolerus saxatilis Hartig, Zhelochovtsev, 1935 : 82 (nec Hartig), **syn. n.**
Dolerus saxatilis saxatilis Hartig, Benson, 1952 (nec Hartig)
Dolerus scoticus arcticola Kaier, Benson, 1953 : 150, **syn. n.**

The Lapland form of this species (which is distinguished from *elderi* and *willoughbyi* in the discussion above under the latter species) will perhaps be separated subspecifically from the North American form when more specimens of the latter become available for comparison ; it would appear to be rather

smaller and to have less red on the front tibiae. It is represented in north Britain by an endemic larger and normally melanic race (with the entire abdomen black) : *Dolerus yukonensis scoticus* Cameron **comb. nov.** At Abisko in 1954 it was widespread almost wherever *Equisetum* occurred above and below the tree-line.

Dolerus gessneri labiosus Konow, **stat. nov.**

Dolerus labiosus Konow, 1897.
Dolerus gessneri var. *labiosus* Konow, Benson, 1934 : 12

D. gessneri occurs in Europe in two subspecies. The small (8–8·5 mm. long) invariably red-banded race, *D. gessneri labiosus*, originally described as a distinct species, occurs throughout Scandinavia, Finland, North Russia and North Siberia as far as the mouth of the River Ob ; it is common at Abisko and probably represents the " *D. bimaculatus* " of Malaise's Abisko list.

The larger typical race (9·5 to 12 mm. long) of North Britain and Central Europe has an entirely black abdomen and only the front knees red ; a red-banded abdomen occurs only as a rare aberration.

In Siberia east of the Yenisei (Zhelochovtsev, 1935), in Kamtchatka (= *D. kamtchaticus* Malaise, 1931) and on the Pacific coast of North America (= *D. konowi* MacGillivray, 1912 = *D. neoaprilis* var. *konowi* MacGill., Ross, 1929) occurs another large melanic race, *D. gessneri konowi* MacGillivray, **stat. nov.** differing from the typical race in that all the legs, including the front pair, are entirely black.

Another very closely related but distinct species is *D. subfasciatus* Smith, 1874 (= *picinus* Marlatt, 1898, **syn. n.**) with a black bodied typical race in Japan and a red-banded race in North America: *D. subfasciatus neoaprilis* MacGillivray, 1908, **comb. nov.** The latter was considered to be conspecific with *D. gessneri* by Ross, 1951, but is distinguished from the latter by its almost impunctate abdomen (very strongly transversely rugulose in all forms of *gessneri*), the presence of a more strongly depressed carinate field on the mesopleura (as described by Ross, 1929) and more finely denticulate teeth on the saw (*cf.* Ross, 1929, fig. 3 or Zhelochovtsev, 1935, fig. 1 for *subfasciatus* in which the eighth tooth from the apex has about thirteen denticulations, with Morice, 1913, fig. 9, for *gessneri* which has about seven.)

Dolerus germanicus fuscipennis (Stephens).

Dosytheus fuscipennis Stephens, 1835.
Dolerus arcticus Thomson, 1871.
Dolerus pratensis var. *arcticus* Thoms., Enslin, 1913 : 162.
Dolerus germanicus fuscipennis (Stephens) Benson, 1945 : 104.

This race, with an entirely black mesonotum in the female, replaces *D. germanicus germanicus* Fabricius of central Europe and Southern England in Scotland, N. Europe and N. W. Siberia. We found a few specimens in which the pronotum was red-marked, but we did not find the species commonly in Lapland. The strongly infuscate wings, the strongly marked temporal furrows on the head, the deeply excised clypeus and the almost impunctate abdomen distinguish the species readily from *D. yukonensis*. It is distributed right across Asia to the Pacific coast in several different subspecies already defined by Zhelochovtsev (1935) ; but it has not been recognised in North America.

Now *D. japonicus* Kirby was treated by Zhelochovtsev as a subspecies of *D. germanicus* ; but it has a very shallow emargination to the front of the clypeus whereas all races of *D. germanicus* have an excision to a depth of at least half the total depth of the clypeus. *D. japonicus*, in fact, is not distinguished morphologically from the North American *D. similis* Norton, and should be called *D. similis japonicus* Kirby, **comb. nov.**

Dolerus aeneus Hartig, 1837.

One of the commonest sawflies at Abisko, as it is throughout the greater part of northern and central Europe.

Dolerus liogaster Thomson.

Dolerus liogaster Thomson, 1871.
Dolerus rugosus Konow, 1884, nec Freymouth.
Dolerus rugosulus Dalla Torre, 1894, **syn. n.**
Dolerus schneideri Kiaer, 1896.
Dolerus brevitarsus Hartig, Benson, 1947 : 63, nec Hartig.

We found one female of this species at Abisko and it was of the form with a red pronotum, front lobe of the mesonotum and spot on the mesopleura, but with entirely black legs.

The forms with a red-marked mesonotum were at one time considered to belong to a distinct species known as *D. schneideri*. I have a female from Finland with, likewise, entirely black legs, another with red femora, and two from South Sweden with red bases to the tibiae as well as red femora but with the front lobe of the mesonotum only red-flecked each side.

Lindqvist (1943 : 72–3) has already shown that " *D. schneideri* " is but an aberration of *D. liogaster*, and he also records that the legs may be all black or red-marked in these forms. The surface of the abdomen also varies from being highly polished with few transverse striations to dull with dense transverse rugulose sculpture. But he does not mention the other colour combination, the black-legged forms without red on the mesonotum ; these have up till now always been treated as belonging to a different species known as *D. rugosulus*.

In Britain and Central Europe generally this entirely black form of the species is the commonest form and it would appear that forms with red legs are less rare in northern regions, while forms, with a red-marked thorax have so far only been found in Scandinavia and North-East Europe. No differences can be found in the genitalia of these various forms.

II. A New Species of *DOLERUS* from Italy.

Dolerus docilus sp. n.

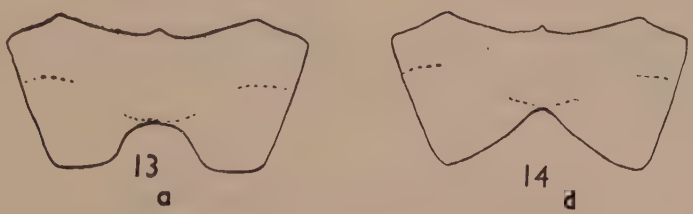
Male.—Black ; wings hyaline, stigma and venation black (even at extreme base of fore wing).

Head : Clypeus in front emarginate for its entire breadth with a V-shaped excision medially to a depth of less than half the lateral depth of the clypeus ; malar space about as long as the breadth of the second antennal segment ; antenna as long as the whole insect without the head, with the third and fourth segments subequal ; temples slightly contracted behind the eyes, with a well-marked post-occipital furrow and with a carina on the hind

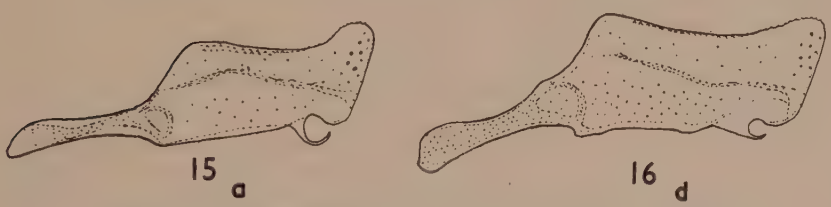
margin of the head : post-ocellar area slightly raised, with short clearly-defined lateral furrows ; whole of head densely and irregularly punctured with only a few very narrow shining interspaces.

Thorax : mesonotum shining ; front lobe irregularly punctured, coarsely at the sides, more finely in the middle, where there are shining interspaces wider than the diameter of the punctures ; lateral lobes shining with shallow irregular punctures, very fine and sparse laterally ; scutellum densely and strongly punctured behind, less densely and more finely medially and in front ; post-tergite of scutellum shining and with the medial length less than the length of a cencher ; mesopleura very densely punctured above, but below, as on the mesosternum, shining with sparse fine punctures ; legs normal.

Abdomen : with transverse rugulous surface sculpture, though the first tergite laterally and the middle tergites on their hind margins are impunctate and shining. Genitalia with penis-valve as in fig. 16*d*.



Figs. 13, 14.—Clypeus of : (13) *D. asper* ; (14) *D. docilus.*



Figs. 15, 16.—Penis valve in : (15) *D. asper* ; (16) *D. docilus.*

Pubescence pale and dense over the whole of the head and thorax, and up to about twice the diameter of an ocellus in length ; on first tergite restricted to a medial patch, and very sparse on second and third tergites dorsally, though it covers the rest of the tergites and the sternites.

Female.—As in male, but antenna is about as long as twice the breadth of the head behind ; pubescence on head and thorax shorter, at most little longer than the diameter of an ocellus ; and tergites of abdomen are shining and sparsely sculptured down the medial line. Sawsheath and saw as in *D. asper* Hartig (*cf.* Benson, 1952, figs. 194 and 175).

Length ; ♂ 8–9 mm.; ♀ 10–11 mm.

Italy, Lombardia : Mercallo, 2 ♂ (including holotype), 3.iv.1955 ; Lago del Segrino, 3 ♂, 5 ♀, 15.iv.55 ; and Lago di Pusiano, 8 ♂, 3 ♀, 15.iv.55 (*L. Ceresa*). (Holotype and paratypes in the British Museum ; paratypes also in the Museo Civico de Storia Naturale, Genova, Italy.)

For Italian material especially of this most interesting new species I am indebted to Dr. D. Guiglia and Signor L. Ceresa. The species is very close to *D. asper* Hartig, as the general similarity of the penis-valve indicates, but externally it is generally be to distinguished by the wide triangular emargination

of the front of the clypeus, and in the female by the much longer pubescence on the head and thorax (in which respect it resembles *D. harwoodi* Benson, *cf* Benson, 1952, figs. 207, 208, 210 and 211).

It may, of course, later come to be treated as a very distinct sub-species of *D. asper*.

The following are the Dolerini now known to me to occur in Italy :

Loderus vestigialis (Klug).
L. pratorum (Fallén).
Dolerus pratensis (L.).
D. germanicus etruscus Klug. (**stat. nov.**).
D. aericeps C. G. Thomson.
D. triplicatus Klug.
D. gonager (Fabricius).
D. puncticollis C. G. Thomson.
D. sanguinicollis Schrank.
D. nigratus rufotorquatus A. Costa.
D. haematodes Klug.
D. picipes Klug.
D. aeneus Hartig.
D. romanus Benson.
D. docilus Benson.
D. megapterus Cameron.

III. Holarctic species of *LODERUS*.

Studies such as the above, involving the correlation of Eurasian and North American species of *Dolerus*, will no doubt reveal further linkages as more material for comparison becomes available.

In the course of these studies attention was paid to the related genus *Loderus* and it became evident that all four of the European species of this genus occur also in North America.

The European *Loderus pratorum* (Fallén, 1808), represented by *L. pratorum gilvipes* (Klug, 1818) in the north, and east of Lake Baikal, is represented in North America by *L. pratorum albifrons* (Norton, 1861), **stat. nov.**, distinguished from the typical race by its mainly red prothorax. This race extends also into East Asia, as I have a specimen from Harbin in Manchuria.

The European *L. eversmanni* (Kirby, 1882) is represented in Japan by *L. eversmanni obscurus* (Marlatt, 1898) **stat. nov.**, likewise distinguished from the typical race by its red prothorax. And in North America it is represented by *L. eversmanni acidus* MacGillivray, 1923, **stat. nov.**, distinguished from the typical race by its red-banded abdomen ; but this race also extends into East Asia as I have a specimen of it collected at Harbin in Manchuria at the same time as the *L. pratorum albifrons*.

Almost parallel races are found in *L. vestigialis* Klug. In Japan *L. vestigialis insulicola* Rohwer, 1910, **stat. nov.**, is likewise distinguished from the typical race by its red prothorax (though this coloration occurs as a rare aberration in the typical race) : while in North America *L. vestigialis apricus* Norton, 1861 **stat. nov.** is again distinguished from the typical race by its red-banded abdomen (and in southern parts of Europe aberrations with a red-banded abdomen occasionally occur in the typical race).

Finally, the Eurasian *L. genucinctus* Zaddach, 1859, is represented in North America by *L. genucinctus napaeus* MacGillivray, 1923, **stat. nov.** ; this form differs from the typical race in lacking the white bases to the tibiae.

References.

Where the references can be found in Konow, 1905, or Ross, 1951, they are not repeated here.

Benson, R. B., 1934, Additions to the list of British Dolerinae (Hymenoptera Symphyta). *Ent. mon. Mag.* **70** : 11–13.

——, 1945, Sawflies represented in the mainland of Britain by two races (Hym. Symphyta). *Ibid.* **81** : 103–5.

——, 1947, Two new European species of *Dolerus* Jurine (Hym., Tenthredinidae). *Ibid.* **83** : 62–4.

——, 1952, *Handbks. Ident. Brit. Ins.* **6** (Hym.) 2 (Symphyta) (b).

——, 1953, Some changes and additions to the list of British Sawflies with the descriptions of two new species (Hym., Tenthredinidae). *Ent. mon. Mag.* **89** : 150–4.

Enslin, E., 1913, Die Tenthredinoidea Mitteleuropas. Beih., *Dtsch. ent. Z.* **1912–17**.

Konow, F. W., 1905, Hym., Tenthredinidae *in* Wytsman, *Gen. Ins.* **29**.

Lindqvist, E., 1943, Zur Kenntnis einiger Tenthrediniden. *Notulae Ent.* **22** : 72–6.

Malaise, R., 1931, Insektfaunan Inom Abisko National Park 2 (5) Tenthredinidae. *K. svenska VetensAkad. Skr. Nat.* **17** : 54–68.

——, 1932, *Svensk Insektenfauna*, **13** (Hym.) 4 (Phytophaga), 33 Tenthredinidae.

Morice, F. D., 1913, Illustrations of specific differences in the saws of female Dolerids. *Trans. ent. Soc. Lond.* **1913** : 428–34, 3 pls.

Ross, H. H., 1929, Sawflies of the Sub-Family Dolerinae of America north of Mexico. *Ill. Biol. Mon.* **12** (3).

——, 1951, Tenthredinidae *in* C. F. W. Muesebeck, K. V. Krombein and H. K. Townes, Hymenoptera of America north of Mexico. *U.S. Dept. Agric., Agric. Mon.* **2**.

Zhelochovtsev, A. N., 1928, Ueber palaärktischen Dolerinae. *Zool. Anz.* **79** : 105–22.

——, 1935, Notes sur les Dolerinae Hym. paléarctiques. *Arch. Mus. zool. Moscow* **2** : 79–85.

Summary

Seven species of *Dolerus* were found to occur at Abisko in Swedish Lapland in 1954. One of them had not been described before and two others belong to species shown here to have been described first in North America. Much new synonymy arises from these studies and new combinations result from the grouping together of several described species as races of polytypic species.

All four European species of *Loderus* are shown for the first time to occur also in N. America, though as distinct races. A new species of *Dolerus* from Italy is described.

A NEW GENUS AND SPECIES OF THRIPIDAE (THYSANOPTERA) FROM TRINIDAD

By Prof. J. Douglas Hood, F.R.E.S.

(Cornell University, Ithaca, N.Y.)

The present species is one of several rich rewards which came as the result of climbing El Tucuche—3100 ft. in elevation and possibly, though not certainly, Trinidad's highest point. Thus the suggestion made by Professor T. W. Kirkpatrick, Entomologist at the Imperial College of Tropical Agriculture, that I climb it on a certain hot tropical day, may not have been wholly facetious.

Plesiopsothrips gen. n.

(*Plesiothrips*, an allied genus; *opris*, aspect.)

Closely resembling and obviously allied to *Plesiothrips* (see the writer's figures of the type species of this latter genus in 1915, *Proc. ent. Soc. Wash.* **17** : 131; and of two other species in 1950, *Rev. Ent., Rio de J.* **21** pl. i, figs. 38–40); but with the head much broader across eyes than long; the median ocellus far behind anterior margin of eyes; the antennae with long, prominent, out-standing setae and a distinct ring-joint at the base of each of segments IV and V, the former of these segments elongated, narrowed apically and vasiform; the prothorax shorter, its notum distinctly and rather heavily cross-striate; the fore wings ensiform, their costal setae not elongated and thus not resembling the fringing hairs; segment IX of abdomen much the longest, fully twice the length of X; and, finally, with the ovipositor well-developed, attaining or surpassing the tip of abdomen.

Type species: *Plesiopsothrips trinidadensis* sp. n.

Dr. H. Priesner, who has studied the type, agrees fully with my placing of the species and by letter stresses several of the characters noted above. *Plesiothrips* would seem to be more specialised, because of the great reduction which the ovipositor has suffered; yet the antennae of *Plesiopsothrips*, with their elongated intermediate segments and enlarged setae, and the strongly recurved wings, also indicate specialisation.

Plesiopsothrips trinidadensis sp. n.

Female (macropterous).—Length about 1 mm. (distended, 1·15 mm.). *Colour* brown, darkest in the first eight abdominal segments, with bright red internal pigmentation in thorax and abdomen; head yellowish medially, excepting in the somewhat shaded occipital and ocellar areas and in the darkened frontal costa, the cheeks and the sides just in front of eyes nearly black; antennae dark grey-brown in segments I and IV–VII, the first of these segments more richly brown than the others, IV and V each with a narrow, perfectly colourless and apparently nearly membranous ring just beyond pedicel, VI with a much narrower pale (but not white) ring in a corresponding position; II paler than I, nearly yellow at apex, heavily shaded along inner surface; III greyish-yellow, with a dark grey band occupying middle third and with a colourless ring around the middle third of pedicel,

its narrowed apical portion shaded lightly at sides and tip ; pterothorax darkened at sides and in the two metanotal sclerites ; legs with all coxae and the mid and hind femora brown, the last of these yellow at tip, the fore femora yellow but shaded, especially along the morphologically dorsal surface ; trochanters and tarsi (excepting the darkened cups) yellow ; tibiae yellow basally and apically, shaded elsewhere, the fore pair palest ; fore wings colourless in basal fourth and dark grey beyond, excepting for a slight cloud at base

Figs. 1, 2.—*Plesiopsothrips trinidadensis* gen. et sp. n. (1) Head and prothorax, ♀ holotype, × 122. (2) Segments III–VII of right antenna, ♀, holotype, × 146.

of anal lobe ; abdomen dark brown in segments I–VIII, the last of these paler and somewhat yellowish medially, IX dusky yellow, obscurely shaded across base and in apical two-fifths, X dusky yellow in about basal third, its remainder dark grey and nearly black at sides.

Head (fig. 1) nearly 0·9 as long as greatest width, which is across eyes, the width across cheeks about equal to its length ; cheeks nearly parallel, roundly converging at base, distinctly serrate as seen from above ; dorsal surface smooth in ocellar area, rather strongly cross-striate elsewhere, especially on occiput, the area in front of ocelli concave and with the sculpture irregularly thickened ; interocellar setae very long (65μ), arising well within

ocellar triangle, their bases only 13μ apart ; other cephalic setae small. *Eyes* large, protruding pilose, their dorsal length about 63μ, width about 41, interval 46. *Ocelli* normal, the centre of the triangle which they form opposite that of eyes. *Mouth-cone* (when not flattened) extending about 77μ beyond posterior margin of head, maxillary palpi 3-segmented. *Antennae* (fig. 2) 7-segmented, more slender than usual, with segment IV especially long, the sense-cones on it and III forked ; setae long, outstanding, mostly dark brown.

Prothorax (fig. 1) about 0·7 as long as wide (exclusive of coxae), the pronotum strongly cross striate excepting in the usual foveae ; outer seta at posterior angles about 49μ, inner about 63, other setae about 27. *Pterothorax* much wider than prothorax (greatest width 0·186) ; mesonotum finely cross-striate in posterior three-fifths, smooth anteriorly ; anterior metanotal sclerite very delicately and closely striate in posterior lateral triangular portions, the diverging striae all orginating at anterior angle of the triangle, the median portion of the sclerite widely cross striate, the remainder of sides of sclerite more or less longitudinally striate ; posterior metanotal sclerite nearly smooth, broader posteriorly, with rounded sides. *Fore wings* rather strongly ensiform, costa with 1 + 14–15 setae (those at middle of wing about 47μ), fore vein with 4 + 11 (apical ones more widely spaced), hind vein with 11 equally-spaced ones, anal lobe with four along anterior margin and one near base at middle.

Abdomen without notable features, almost free of sculpture ; segment X divided in a little more than one-half its length ; ovipositor well-developed, 204μ long ; apical setae long, slender, yellow, segment IX with seta I 140μ, II 149, III 107, X with seta I 129, II 136.

Measurements of ♀ (holotype), in mm. (additional to those given above) : *Head*, total length 0·110, greatest width across eyes 0·127, greatest width across cheeks 0·113, width at base 0·101. *Prothorax*, median length of pronotum 0·097, width of pronotum 0·138. *Mesothorax*, width across anterior angles 0·156. *Metathorax*, greatest width posteriorly 0·181. *Abdomen*, greatest width (at segment IV) 0·190.

Antennal segments .	I	II	III	IV	V	VI	VII
Length (μ) . .	25	33	50	67	37	46	31
Width (μ) . .	29	25	20	19	16	18	6–7

Total length of antenna, 0·289 mm.

Holotype ♀, TRINIDAD : El Tucuche, 22.vi.1951 (*J. D. Hood*). Taken from a dead branch though the species is, of course, a feeder on green vegetation. The holotype is in the author's collection.

A DESCRIPTION OF THE MALE OF *ATYPHLOCERAS NUPERUS PALINUS* (JORDAN) (SIPHONAPTERA: HYSTRICHOPSYLLIDAE).

By F. G. A. M. Smit, F.R.E.S.

(*British Museum (Natural History), Zoological Museum, Tring, Herts.*)

The flea *Atyphloceras nuperus palinus* was described (Jordan, 1931*b*: 231) under the generic name *Saphiopsylla* Jordan (now considered a synonym of *Atyphloceras* Jordan and Rothschild; *see* Hopkins, 1952: 365) from one female collected at San Martino di Castrozza in the southern Dolomites,[1] Italy. Since then a few more specimens of both sexes of this subspecies have been recorded in the literature, but the male has not been described. A male from Hofeberg, Glatzer Schneeberg,[2] was kindly presented to the collection of fleas at Tring by Prof. F. Pax in 1935, but in view of the rather great distance from the type-locality we abstained from describing this male, though it stood as subspecies *palinus* in the collection; Maschke, who collected this specimen, cautiously remarked (1935: 88): "Ob die Exemplare von Hofeberg etwa einer dritten Subspecies angehören, läszt sich erst mit Sicherheit entscheiden, wenn Männchen aus den Dolomiten oder Weibchen aus dem Schneegebirge vorliegen." Rosický (1947: 31, 32) made a similar remark.

Recently I received through the courtesy of Prof. H. Strouhal (Administrativer Direktor des Naturhistorisches Museums in Vienna) a collection of fleas obtained in Austria by Prof. H. Franz, and was delighted to find that this material contained one male *Atyphloceras*, collected at Donnersbach, Styria. This specimen agrees, on non-sexual characters, with the subspecies *palinus* and it seems safe to refer this male to this subspecies, the distance from the type-locality being only just over 200 km. (about 130 miles) and the intervening country being similar geologically and in elevation. The male from the Glatzer Schneeberg is identical with the Austrian male, and we may therefore also accept the specimens recorded from Moravia as correctly referred to the subspecies *palinus*, but some reservation may be necessary with regard to the specimens recorded from Yugoslavia.

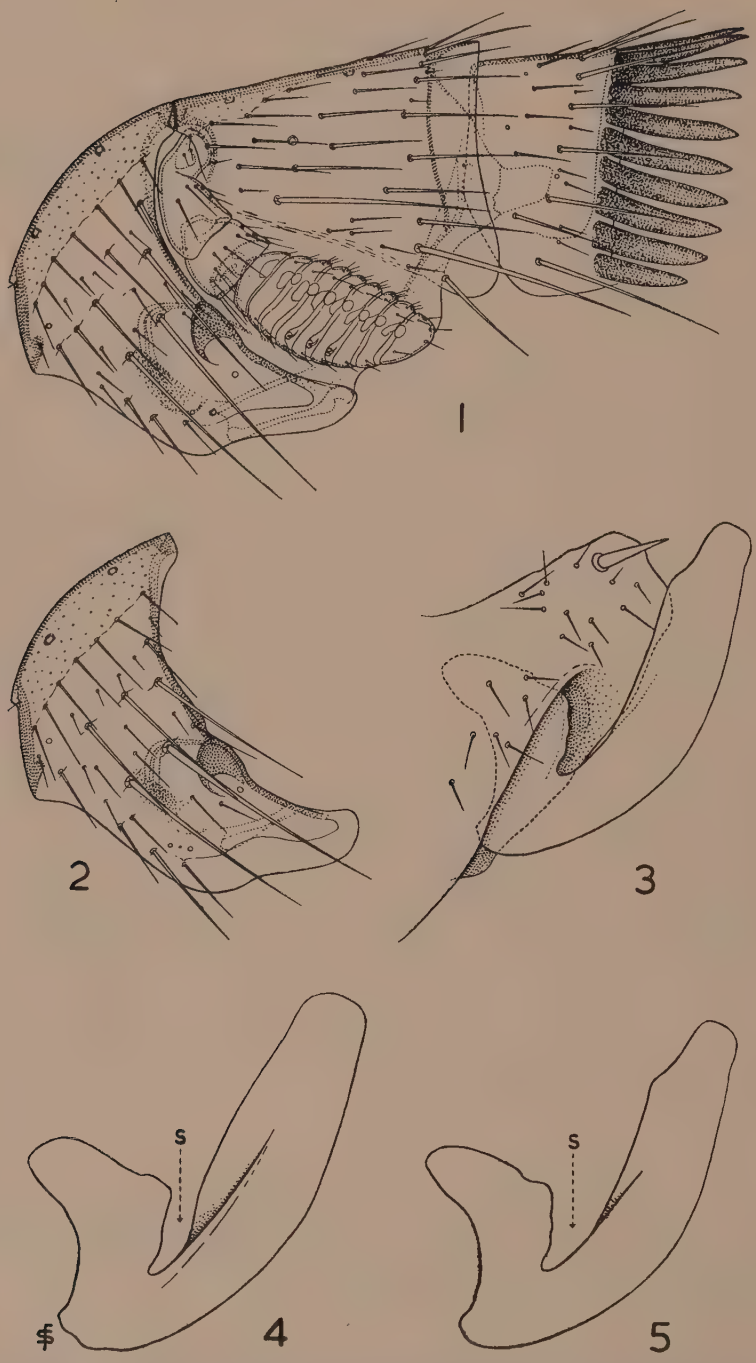
Atyphloceras nuperus palinus (Jordan).

Male: In both sexes the seta along the genal margin of the head and exactly below the place of attachment of the tentorial arm (the second seta from behind) is markedly longer than the corresponding one in the nominate subspecies (fig. 2, *cf.* fig. 1). A difference in head-chaetotaxy is unusual in subspecies of fleas.

There are no significant differences in the numbers of spines in the pronotal ctenidium

[1] The subspecific name *palinus* is derived from Pala, the name of a group of mountains in the Dolomites near San Martino di Castrozza.

[2] This range was then in German Silesia but is now in Poland (on the frontier with Moravia); in the Czech literature the Glatzer Schneeberg is called Králický Sněžník.



FIGS. 1–5.—(1) (4) *Atyphloceras nuperus nuperus* (Jordan). 1. Head and pronotum, ♂ (paratype). 4. Outline of movable process of clasper (paratype). (2) (3) (5), *A. nuperus palinus* (Jordan). 2. Preantennal part of head, ♂ (Austria). 3. Inner side of clasper (Austria). 5. Outline of movable process of clasper (Austria).

or in the number of tergal spinulets ; the figures (for the two sides together) for each of the examined specimens are :

	nuperus nuperus			*nuperus palinus*		
	♂	♂	♀	♂	♂	♀
Pronotal ctenidium .	21	22	22	22	22	23
Tergum I . .	7	7	8	8	8	10
,, II . .	13	10	11	12	11	13
,, III . .	10	10	10	10	10	11
,, IV . .	10	7	10	6	7	7
,, V . .	6	6	6	7	7	5
,, VI . .	3	3	2	3	5	2

Sternum VIII has 27–30 setae on both sides together (25 in Peus' specimen from Undigen, Germany) ; in the nominate subspecies there are 19–23 setae. Process P of clasper broader than in *n. nuperus* and its apical margin not convex. Movable process of clasper narrow, with subparallel sides, its concave anterior margin distinctly angulate subapically, and the sinus *s* (*see* fig. 5) *V*-shaped ; in *nuperus* s. str. the movable process is spindle-shaped, its anterior margin being convex and without a marked subapical angle, while sinus *s* (fig. 4) is narrow. The acetabular part of the movable process is rather variable in both subspecies, as is the length of the stout spiniform seta on the inner side of the fixed process near the apex.

The structure of the clasper is unusual : when looking at cleared specimens one observes a number of slender setae on the inner side of the corpus of the clasper, several of which appear to be inserted on the acetabular part of the movable process (*see* figs. 6 and 7), where bristles are never found. The explanation can be seen from fig. 3, showing the inner side of the clasper : the acetabular part of the movable process is fitted into a deep slit of the corpus of clasper and the bristles are on the outer side of the inner wall of the latter! I do not think that this structural peculiarity has ever been observed before, and it would be of interest to find out in which other genera of fleas this mode of attachment of the movable process to the corpus of the clasper also occurs.

There are no obvious differences in the structure of the phallosome between the two subspecies.

The female of each subspecies has been adequately described by Jordan (1931*a* and 1931*b*).

The following records of each subspecies are all that I have been able to trace :

Atyphloceras nuperus nuperus (Jordan) :

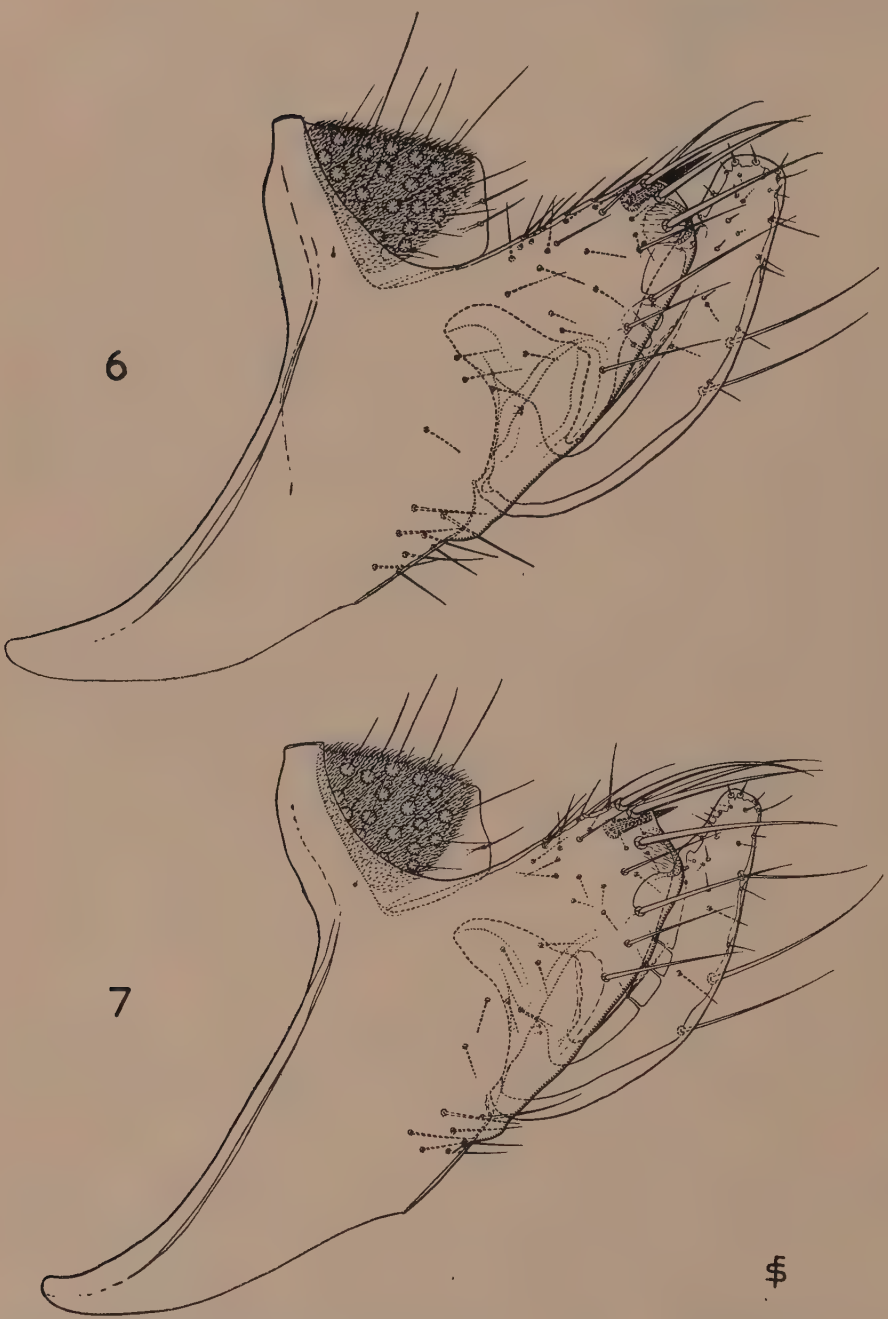
2 ♂ 1 ♀, La Bourboule (45° 35′ N., 2° 45′ E.), 1200 m., Puy de Dôme, France, off *Clethrionomys glareolus* and *Microtus agrestis*, ix.1930 (Jordan, 1931*a* : 229).

Atyphloceras nuperus palinus (Jordan) :

1 ♀, San Martino di Castrozza (46° 15′ N., 11° 19′ E.), Italian Dolomites, 1450 m., from mouse nest, 18.ix.1930 (Jordan, 1931*b* : 231).

1 ♂, sieved from detritus washed ashore on the bank of the Donnersbach, near Donnersbach, Styria, Austria, 1.x.1943 (*H. Franz*).

1 ♂ 1 ♀, Undingen near Reutlingen (48° 30′ N., 9° 13′ E.), on the Rauhe Alb range (= Swabian Jura), Württemberg, Germany, host not known, x.1954 (*K. Fischer*). (1955, Peus *in litt.*).



FIGS. 6–7.—(6) *Atyphloceras nuperus nuperus* (Jordan). Clasper and sensilium (paratype).
(7) *A. nuperus palinus* (Jordan). Clasper and sensilium (Austria).

1 (?) ♂, Hofeberg, 780–800 m., Glatzer Schneeberg (50° 27′ N., 16° 50′ E.), Poland, off *Clethrionomys glareolus*, iv.1933. (*K. Maschke*). (Maschke, 1935 : 88).

? ♂ ? ♀, near the source of the River March (= R. Morava), on the south side of the Glatzer Schneeberg, Moravia, Czechoslovakia, off *C. glareolus*, xi.1946 (Rosický, 1947 : 32).

1 ♀, Desná, Altvatergebirge (= Jeseníký, 50° 7′ N., 17° 14′ E.), off *C. glareolus*, 2.x. (year ?) (Rosický, 1950 : 143).
(Rosický, 1952 : 9, gives above two localities but adds as host : *Microtus agrestis*.)

? ♂ ? ♀, Mt. Suvo Rudište, 1700 m., in the Kopaonik Mts., Yugoslavia, off *Apodemus flavicollis* (Wagner, 1939 : 156).

Ioff *et al.* (1946 : 93) record 1 ♀ " *Saphiopsylla nupera* " from near Teberda, Caucasus (43° 33′ N., 41° 45′ E.), from *Chionomys* (= *Microtus*), and state that they find it difficult to distinguish this one female from the nominate subspecies, which they only knew from the original description. On zoogeographical grounds it is probable that the form occurring in the Caucasus will prove to be different from the two known subspecies.

Both subspecies of *Atyphloceras nuperus* are obviously rather rare parasites of microtine rodents ; they seem to be confined to mountainous regions and, on present evidence, are more frequent in the autumn than in the other seasons. The Austrian male, described above, was found in detritus (apparently nest material of a *Microtus* or *Clethrionomys*), on the shore of a small brook, together with 1 ♂ 2 ♀ *Ctenophthalmus congener congener*, 9 ♂ transitional between *C. agyrtes agyrtes* and *C. a. smitianus*, 1 ♂ *C. agyrtes agyrtes* and 2 ♀ *C. agyrtes* which cannot be identified to subspecies. This mode of dispersal of mammal fleas may help to explain the occurrence of species, and especially of subspecies at " unsuitable " localities along extensive waterways.

Acknowledgment.

My sincere thanks are due to Professor F. Peus for kindly reading the manuscript and for inviting me to incorporate in the list of records the specimens he recently acquired from southwest Germany.

References.

Hopkins, G. H. E. 1952, Notes on synonymy in Siphonaptera. *J. Wash. Acad. Sci.* **42** : 363–365.

Ioff, I., Tiflov, V., Argyropulo, A., Fedina, O., Dudolkina, L., and Shiranovich, P., 1946, New species of fleas (Aphaniptera). *Med. Parasit., Moscow* **15** : 85–94

Jordan, K., 1931*a*, Siphonaptera collected by Mr. F. J. Cox in France. *Novit. zool.* **36** : 225–229, figs. 1–4.

——, 1931*b*, Records of fleas from the Austrian Tirol and the Dolomites. *Ibid.* **36** : 230–232, fig. 1.

Maschke, K., 1935, Flöhe von Kleinsäugern des Glatzer Schneeberges. In *Beitr. Biol. Glatz. Schneeb.*, Breslau (1) : 86–88.

Rosický B., 1947, Příspěvek k poznání blech (Aphaniptera) Jeseníků. *Ent. Listy* (*Folia ent.*) **10** : 30–32.

——, 1950, Biocenosy a ekologie blech střední Evropy. *Věstn. Čsl. Zool. spol.* **14** : 97–148.

——, 1953, I. Dodatek k prodromu blech (Aphaniptera) Csr. *Acta ent. Mus. nat. Prag.* **28** : 5–18.

Wagner, J., 1939, Beiträge zur Kenntnis der Aphanipterenfauna Jugoslaviens. *Bull. Soc. sci. Skoplje* **20** : 155–163.

Book Notices.

South African Animal Life. Volume 1. Edited by Bertil Hanström, Per Brinck and Gustaf Rudebeck. [Results of the Lund University Expedition in 1950–1951.] Large 8vo. Stockholm (Almqvist & Wiksell). 1955. Pp. [vi], 518, 81 text-figs. Price Swkr. 68.00.

This is the first of a projected series of eight volumes comprising the results of the Lund University Expedition to South Africa in 1950–1951. More than a hundred specialists have been working on the material collected and Volume 1 contains six papers, by Bertil Hanström, Per Brinck, E. Marcus, Gustaf Rudebeck, R. F. Lawrence and M. Beier, two of which are of a general nature, three non-entomological and the last paper by P. Brinck on the Whirligig Beetles of Southern Rhodesia is a major work comprising more than a third of the volume.

The work is well produced and fully illustrated.

The Butterflies of the Malay Peninsula. By A. S. Corbet and H. M. Pendlebury. 2nd ed. rev. and enl. 8vo. Edinburgh & London (Oliver & Boyd), 1956. Pp. xii + 537, 55 pls. (8 col.). Price £5 5*s.* 0*d.*

The first edition of this book was published in Kuala Lumpur in 1934. Between that date and his death in 1948 Dr. Corbet made an intensive study of almost all the extant collections of Malayan butterflies ranging from that made by J. Koenig (a pupil of Linnaeus) in 1779 to those made in prison camps and behind the enemy lines during the Japanese occupation.

The new edition is therefore thoroughly comprehensive and no butterfly known to occur in Malaya has been omitted from consideration.

The work is divided into three parts. Part I (Introduction, 77 pages) consists of ten general chapters covering biology, nomenclature, geographical distribution, wing pattern, duplex species and the origin of species, some mathematical considerations, the history of butterfly collecting in the Malay Peninsula, and notes on collecting and the preparation and preservation of specimens.

In Part II (270 pages, Discussion of the Species) the species are dealt with systematically by families and keys are given for the identification of species. Part III (100 pages) comprises a synonymic list of the butterflies of the area, a census of species and races, list of food plants, bibliography, general index, index to scientific and index to English names of butterflies.

The volume is profusely illustrated with 35 plates, eight of which are in colour, and there are also 20 line plates of drawings of genitalia as well as numerous text-figures. A great many of the species are illustrated for the first time and the book should enable a worker to identify any butterfly met with in Malaya.

Annual Review of Entomolgy. Vol. 1. Edited by Edward A. Steinhaus and Ray F. Smith. 8vo. Stanford (Annual Reviews, Inc.); London (H. K. Lewis), 1956. Pp. x + 466, text illust. Price $7.50.

This is the first volume of a new series undertaken by Annual Reviews Incorporated, which in 1931 commenced publication of annual reviews designed to cover the current literature in major fields of science.

The series was initiated with the *Annual Review of Biochemistry* and now nine fields are covered by these reviews.

The new entomological series is published with the co-operation of the Entomological Society of America. Its primary object is to publish authoritative and concise treatments of subjects of current interest. It is anticipated that the more active fields of entomological research will require critical reviews annually, while the less active may be summarised and evaluated as developments require.

The Reviews are designed for those engaged in teaching and research and whose background knowledge of the subject is already well established.

Soil Zoology. Edited by D. K. McE. Kevan. 8vo. London (Butterworth's Scientific Publications); New York (Academic Press, Inc.), 1955. Pp. xiv + 512, 34 tabs., 171 text-figs. Price 55*s*.

This book contains the papers read at the Second Easter School in Agricultural Science organised by the University of Nottingham School of Agriculture, together with a full account of the techniques demonstrated.

The volume is in two parts, Part I (General) being in five sections comprising introductory papers, papers on pedology, papers on ecology, applied aspects, and zoophagous fungi, and Part II (Methods) in four sections dealing with sampling and estimation, culture methods, preparations, and physiology.

There follows a key to the orders and sub-orders of soil and litter-inhabiting animals. The work is very fully indexed, there being an author index (including the contributors to discussions), an index to animal genera, an index to plant genera, as well as a general index.

The book is not intended as a text-book of zoology, but it is hoped that the wide range of papers contained in it will serve to promote interest in the study of soil fauna by indicating some of the problems in this field and the methods by which they may be tackled.

STUDIES ON SOME INDIAN THYSANOPTERA—II.

By T. N. Ananthakrishnan, F.R.E.S.

(*Department of Zoology, Loyola College, Madras.*)

The present paper comprises a description of a new species of *Hoplandrothrips* Hood, the first species of this genus to be recorded from India, a redescription of the genus *Chiridothrips* Ramakrishna and Margabandhu and *C. indicus* R. & M. and a note on sexual dimorphism in *Veerabahuthrips bambusae* Rama-

Fig. 1.—*Hoplandrothrips priesneri* sp. n., ♂. *a*, ♂ antenna.

krishna. *Hoplandrothrips priesneri* is dedicated to Dr. Priesner of Egypt in gratitude for valuable help rendered in many ways and in particular for examining the type specimen and confirming it as a new species.

Hoplandrothrips priesneri sp. n.

Male (*Macropterous*) : Total length 1·638 mm. Body bicolorous, general colour bright yellowish-brown. Head (except mouth cone), pterothorax, seventh to tenth abdominal segments and first, second, seventh and eighth antennal segments brown ; third segment pale yellowish-brown ; fourth, fifth and sixth segments pale at basal third, the rest brown ; outer margins of mid and hind tibiae tinged with brown ; first to seventh abdominal segments at sides with dark brown longitudinal streaks ; rest of body dark lemon-yellow. Eyes black ; ocelli with red pigment. Body bristles pale.

Head 1·3 times as long as greatest width, broadest at middle, rounded to the eyes, forming a distinct constriction below the eyes, where it is narrowest (126μ) ; thence diverging behind, greatest width across cheeks ; cheeks with three pointed spines, the most pos-

terior of which is strong and pointed, measuring 15μ; cheeks below eyes, with small warts. Vertex weakly produced; postoculars very long (70μ), 1·25 times longer than eyes and dilated at apex and situated 28μ behind eyes and 14μ from the sides. *Eyes* 0·3 times head length, 42μ wide; interocular space slightly wider than an eye. *Ocelli* not equidistant, the median and posterior ocelli being 0·5 times the distance the latter are from each other. Posterior ocelli on a level with middle of eyes, the median ocellus on a level with anterior margin of eyes at the base of the interantennal projection. *Antennae* long, about 1·8 times the head length, slender. Third and fourth segments clavate, twice as long as their greatest width; fifth to eighth more slender than previous segments, the fifth being 2·7 times as long as broad; sixth and seventh almost equal; eighth constricted at base, distinctly conical. *Mouth cone* attaining middle of prosternum; labium rounded, slightly surpassed by the acute labrum.

Prothorax 1·8 times as broad across coxae as the median length of the pronotum, which is 0·64 times the head length. Prothoracic bristles very well developed, long, setiform, dilated at apex. Anteroangulars 87μ; midlaterals 70μ; epimerals 58μ; postangulars 64μ. *Pterothorax* wider than prothorax, widest anteriorly, with a projection at each anterior angle. *Fore legs* not much enlarged, fore femora with a tooth at apex (the second smaller tooth being absent), fore tibia unarmed and fore tarsus with a small, triangular tooth at apex. *Wings* slender, wide at base, sides nearly parallel with few accessory hairs. *Abdomen* narrower than pterothorax, 224μ wide at base, gradually converging behind to tube, abdominal segment IX being 98μ wide. Abdominal bristles long and pointed. Outer bristles on segment IX 112μ long. *Tube* 126μ long, shorter than head, 56μ wide at base and 28μ at tip. Outer anal bristles very long, setiform (154μ).

Measurements:

Body (total length) 1·638 mm.; *head*, length 172μ, width at middle 140μ, width across eyes 112μ; *prothorax*, length 140μ, width 224μ (inclusive of coxae); *pterothorax*, length 280μ; *mesothoracic* width 280μ; *metathoracic* width 252μ; *tube*, length 126μ.

Antennal segments—length (width) in μ: 32(32); 42(26); 61(29); 58(29); 51(26); 45(22); 38(19); 35(13).

Holotype ♂, India: Madras, on *Andropogon pertusus*, xi.1954. In the author's collection, *T.N.A. No.* 200.

In general structure *Hoplandrothrips priesneri* closely resembles *H. fusciflavus* Hood, but it can readily be distinguished by the bicolorous body, unarmed fore tibia of the male, postoculars 0·4 times head length, cheeks with three spines and antennae 1·8 times head length.

Chiridothrips (Ramakrishna and Margabandhu).

Ramakrishna & Margabandhu, 1939, *Rec. Indian Mus.* **41**: 32; 1940, *Cat. Indian Insects*, Pt. **25**: 47.
Priesner, 1949, *Bull. Soc. Fouad Ier Ent.* **33**: 87.

Ramakrishna and Margabandhu (1939) erected the genus *Chiridothrips* for chirothripoid forms with the second antennal segment dilated at the apex, the eighth segment longer than the third and the head broad at the base, distinctly converging anteriorly. Since the authors of this genus based their description on a single mutilated specimen, misleading inaccuracies such as, " one of the legs *probably with a tooth-like projection; fore femora seem to have* 1–2 *teeth inside* and *may be fore tibia as well* ", were expressed. Furthermore, the type species had only " an apparently 7-jointed antenna with no marked

divisions between 7 and 8 joints ". Measurements are given for the seventh and eighth segments. The genus has, therefore, been redescribed, based on a fresh male specimen recently collected by the author from *Andropogon pertusus* in Madras.

Head about as long as wide, narrowing anteriorly and widening at base, produced into a small anterior antenniferous process. *Antennae* 8-segmented ; middle segments short ; second segment produced exteriorly as in *Chirothrips* ; eighth segment distinctly longer than third. *Mouth cone* broadly triangular and blunt. *Prothorax* heavy, pyramidal. *Legs* short, fore femora stout in the male, with a small tooth at apex of outer margin ; fore tarsus with a short stout, triangular tooth. Fore femora without teeth at inner margin and fore tibia also without teeth. *Tube* long, almost as long as head. *Abdomen* with long lateral bristles, the dorsal ones knobbed.

Chiridothrips indicus (Ramakrishna and Margabandhu).

Male (*Macropterous*).—Total length 1·078 mm. (terminal abdominal segments slightly retracted). General body colour uniform dark brown, except third to eighth antennal segments, distal half of second segment and anterior portions of fore femora, tibia and tarsi, which are yellowish-grey brown ; eyes black.

Head, 140μ long, 168μ wide at base and 154μ below eyes, distinctly converging anteriorly, where it is 140μ across the eyes, and produced into an antenniferous process 14μ long. Cheeks with faint warts carrying inconspicuous bristles. *Eyes* large, 56μ long and 42μ wide ; interocular space 56μ. *Ocelli* not equidistant, the median and posterior ocelli being 0·75 times the distance the latter are from each other. Posterior ocelli placed just above middle of eyes and median ocellus at the base of the antenniferous process, in a level with the anterior margin of the eyes. Postoculars short (35μ), blunt tipped. Mouth cone broadly triangular, reaching beyond the middle of the prosternum. *Antennae* 8-segmented, basal segment short and stout ; second segment produced exteriorly, chirothripoid ; third to sixth segments narrow at base, broadening distally ; fourth segment longer than third ; seventh and eighth distinctly separate, eighth fusiform, much longer than third and seventh. Sense cone formula : 3^{1+1} ; 4^{1+1} ; 5^{1+1} ; 6^{0+1}.

Prothorax 140μ long at middle, 196μ wide at anterior margin and 280μ at base including coxa. Prothoracic bristles short, knobbed. Anteroangulars 26μ ; anteromarginals 16μ ; midlaterals 48μ ; epimerals 60μ ; postangulars 54μ ; coxals 35μ. *Pterothorax* much wider than long, 322μ wide at mesothorax and 238μ long at middle ; *Legs* short ; fore legs well developed ; fore femora stout, 112μ wide at base, without tooth at inner margin, but with a small tooth-like prominance at apex of outer margin, as in *Chirothrips molestus* Pr. Fore tibia short, without teeth. Fore tarsus with a small, curved tooth. Tarsal claw absent. *Wing* long, reaching to tip of abdomen, clear, wing fringes brown.

Abdomen broad at base, narrowing to tube. Segment IX with two small stout spines 25μ long. Abdominal segments with long lateral bristles, the dorsal bristles much longer and knobbed. *Tube* almost as long as head (140μ), 56μ wide at base and 30μ at tip. Anal bristles 70μ long.

Measurements :

Body (total length) 1·078 mm ; *head*, length 140μ, width at base 168μ, width across eyes 140μ ; *prothorax*, length 140μ, width anteriorly 196μ, width at base 280μ ; *pterothorax*, length 238μ, width at base 322μ ; *tube*, length 140μ.

Antennal segments—length (width) in μ : 19(29) ; 35(28) ; 35(26) ; 38(26) ; 35(22) ; 32(19) ; 35(16) ; 45(10).

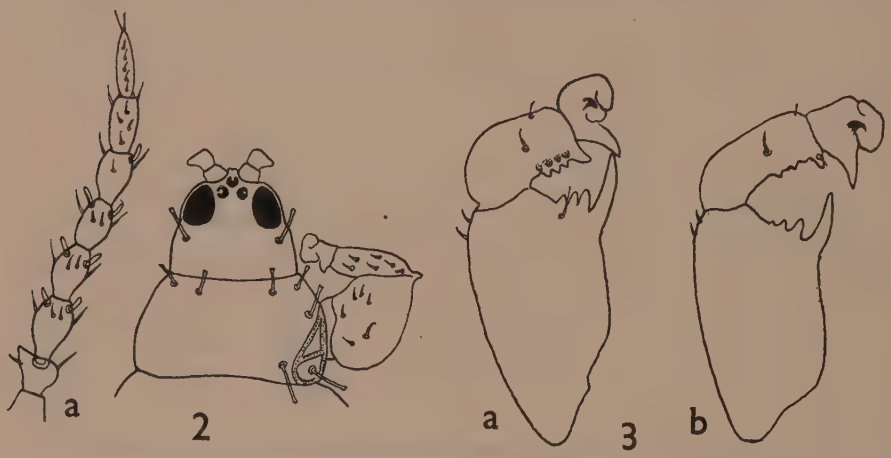
INDIA : Madras, on *Andropogon pertusus*, x.1954 (*T.N.A.*) No. 201.

Veerabahuthrips bambusae Ramakrishna.

Ramakrishna, 1932, *Rec. Indian Mus.* **34** : 277–278.
Ramakrishna & Margabandhu, 1940, *Cat. Indian Insects*, Pt. **25** : 56–57.
Priesner, 1949, *Bull Soc. Fouad. Ier Ent.* **33** : 151

Sexual dimorphism.

In addition to the obvious differences of the male and female, the arrangement of the femoral teeth and tibial tubercles are peculiar to the sexes. The



Figs. 2–3.—(2) *Chiridothrips indicus* Ram. and Marg., ♂. *a*, ♂ antenna.
(3) *Veerabahuthrips bambusae* Ram. *a*, ♀ foreleg ; *b*, ♂ foreleg.

four femoral teeth of the female measure respectively 87, 32, 16, and 10μ, while in the male they are 60, 22, 13, and 3μ, with the fourth teeth practically absent or seen as a minute tubercle. Further, of the four tibial tubercles, the distal one towards the tarsus is stout and long, being half as broad as long. The presence, in the female only, of an additional row of four tubercles, dorsal to the inner row, and alternating with the latter, has been overlooked. In six females examined, it is clear that this is peculiar to the females. In the males the tibial tubercles are smaller, the inner marginal row alone being present. A tarsal claw is also distinct and present in both sexes.

TIKOLOSHANES, A NEW GENUS OF DYTISCIDAE (COL.) FROM SOUTH AFRICA.

By Joyce Omer-Cooper, F.R.E.S.

(*Department of Zoology, Rhodes University, Grahamstown.*)

Whilst collecting in the northern region of the Eastern Cape Province of South Africa in 1955 specimens were taken of an unfamiliar species, which, at first sight, appeared to be a new species of the genus *Eretes*. Examination, however, showed that the resemblance was superficial and the species belonged to the tribe Thermonectini, evidently close to the genus *Aethionectes* Sharp. The differences, nevertheless, warrant separation as a new genus if *Thermonectes*, *Aethionectes* and *Graphoderus* are indeed, valid genera.[1]

The tribe Thermonectini comprises those members of the sub-family Dytiscinae with the posterior border of the first four meta-tarsal segments completely fringed with hairs, tibial spurs bifid and episternal sutures curved, and the prothorax is without a lateral border.

Key to the Genera of Thermonectini.

A. Coxal lines distinct.

1. Elytra and underside strongly punctured . . . . . **Acilius** Leach
2. Elytra finely and doubly but not closely punctured. Meta-tibia with the external face smooth and the internal face provided with a fairly long, oblique row of bifid spines continued almost to the base by a few widely spaced much reduced spines (fig. 3). Prosternum very incrassate. Episternal sutures not very curved. Supra-articular border of meta-coxae narrow. *Male* : Last visible abdominal sternite emarginate. Intermediate tarsi provided with two rows of very small suckers. *Female* : with a coarse punctuation superimposed on anterior quarter of disc of elytra **Tikoloshanes** gen. n.
3. Elytra very finely, doubly and very closely punctured. Meta-tibia with external face spinose (in some species the number may be few and the spines much reduced) and internal face provided with a short row of close-set bifid spines roughly parallel with the posterior border
   - (*a*) Last visible abdominal sternite of male emarginate. Prosternum incrassate. *Male* : Intermediate tarsi provided with two rows of small suckers . . . . **Aethionectes** Sharp
   - (*b*) Last visible abdominal sternite of male not emarginate.
     - a′ Coxal lines stronger and supra-articular border broad. Prosternum incrassate. Middle femora with long setae. *Male* : Intermediate tarsi simple . . . **Thermonectes** Crotch
     - a″ Coxal lines finer and supra-articular border less broad. Prosternum scarcely incrassate. *Male* : Intermediate tarsi usually with two rows of small suckers . **Graphoderus** Stephens

[1] Müller (1942) has separated *A. oberthuri* Régimbart from Sharp's genus *Aethionectes* and placed it in a separate genus *Afronectes*. There seems little justification for this.

B. Coxal lines obsolete
1. Middle femora with short spines. *Male* : Anterior tarsal palettes with basal fringing hairs . . . . . **Rhantaticus** Sharp
2. Middle femora with moderately long setae. *Male* : Anterior tarsal palettes without basal fringing hairs . . . . **Sandrocottus** Sharp

The name *Tikoloshanes* is derived from *Tikoloshe*, a sprite believed by the Xhosa tribe of the Bantu people, who inhabit these parts, to dwell in ponds and rivers and much feared by them. He may also emerge and ride around the country-side on a baboon. *Tikoloshana* is the diminutive form of the name.

Tikoloshanes gen. n.

Scutellum visible, anterior border of eyes not emarginate, prosternum and prosternal process on the same plane, tarsi pentamerous, posterior margins of meta-tarsal segments provided with a fringe of squamous cilia. Tibial spurs bifid. Head region in front of eyes reduced; eyes prominent, antennae long and slender. Pronotum without lateral margins; elytra finely and doubly but not closely punctured.

Underside.—Meta-thoracic epimera partly visible. Episternal sutures slightly curved, extremity of meta sternal wing widened. Prosternum very incrassate in front of anterior coxae, the process slightly narrowed between them, then broadly lanceolate. Coxal lines distinct, short, turned outwards, marking off a rather narrow supra-articular border. Posterior tibiae with external face smooth and with the internal face provided with an oblique row of bifid spines continued almost to the base of the segment by a few widely spaced reduced spines. Meta-tarsal claws slightly unequal and curved at the tip.

Male.—Front tarsi with palettes provided with a basal fringe of hairs and beneath with three widely spaced large suckers placed posteriorly and some small ones at the sides and anteriorly. Middle tarsi scarcely enlarged, but provided beneath with two rows of very small suckers. Last visible abdominal sternite emarginate.

Female.—Anterior quarter of disc of elytra bears large punctures superimposed on the normal punctuation.

Type species : *Tikoloshanes eretiformis* sp. n.

Tikoloshanes eretiformis sp. n. (Fig. 1.)

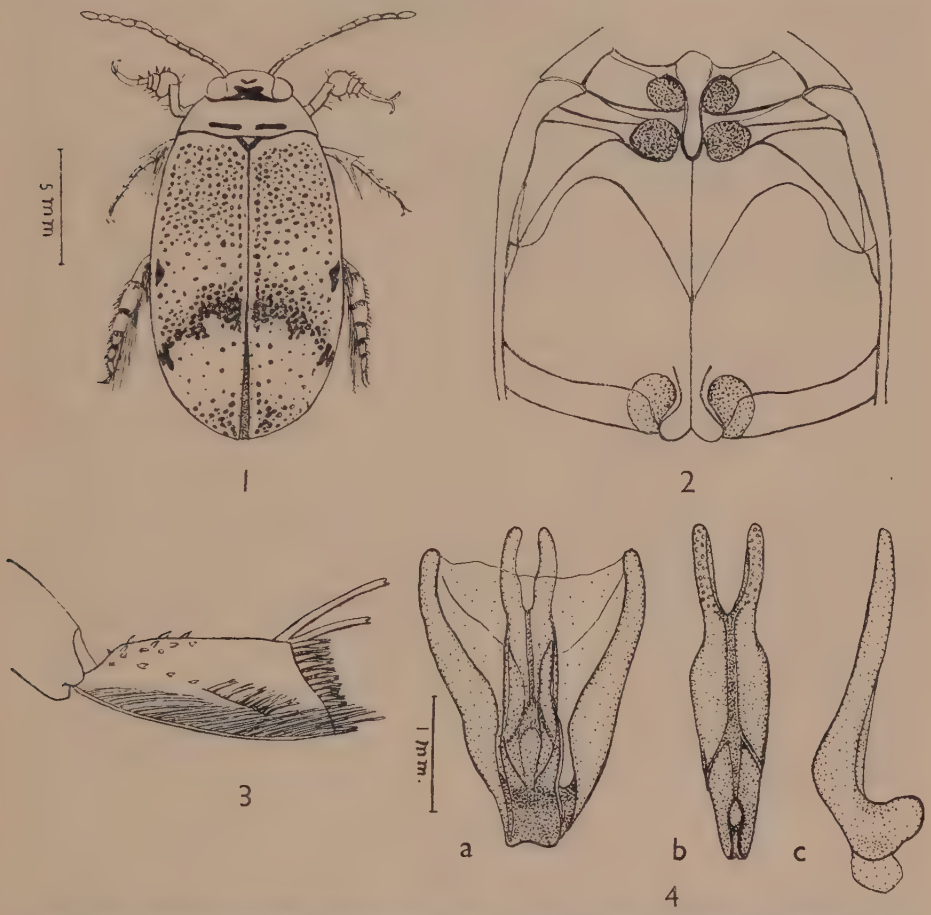
Size : 15 mm. (Size range 13·5–15·5 mm.)

Elongate oval, shining, pale testaceous with black markings on head and pronotum and elytra mottled with black. Antennae testaceous, long and slender. Punctuation fine but not close. Underside ferrugineous with prosternum (except the process which is pitchy) and front legs, testaceous. Meta-tibia black, meta-tarsi testaceous.

Head.—Shining, testaceous with hind border, united in the middle to two divaricate spots, black. In front of these on the vertex are two small, oval, obliquely placed black spots united by their bases in the middle line. Sides of clypeus oblique, front truncate. Punctuation fine and rather sparse, a little denser and coarser on frons and clypeus, very finely and obscurely micro-reticulate.

Pronotum.—Rather short, wide at the base, rather abruptly narrowed anteriorly. Sides not bordered, although there is an indication of a fine border posteriorly; scarcely rounded, pale testaceous with anterior, posterior and lateral borders brownish and two separated, laterally elongated black marks on either side in front of the base. Punctuation fine, not dense, irregular, denser at the sides a short distance in from the margins and in a line parallel with the anterior border, particularly so a short distance on either side of the middle line. A narrow area in middle of pronotum almost impunctate, as is also the marginal region. Hind angles a little produced backwards, rounded.

Elytra.—Shining, pale testaceous speckled with black, leaving, however, an irregular anterior band, the margins and the suture, almost clear. The black irrorations are condensed behind the middle, then become rarer, leaving an ante-apical region with an irregular dark border, lighter. At the apex the irrorations more numerous but less condensed than anterior portion of elytra. Just behind the middle a marginal elongated black mark present and another double one behind, ending the irregular black line forming the anterior



Figs. 1–4.—(1) *Tikoloshanes eretiformis* gen. et sp. n (2) Underside of thorax. (3) Internal face of the meta-tibia. (4) (*a*) Aedeagus; (*b*) median lobe ventral view; (*c*) left paramere.

border of the light pre-apical patch. Punctuation fine but not dense, the punctures being of two sizes and irregularly placed, whilst, with a high magnification, a background of an excessively finely punctured and obscure micro-reticulation becomes apparent. Density of irrorations and size and shape of marginal spots varies in different individuals. There are three serial rows of punctures consisting of rather widely spaced small groups, each group set in a black spot. The internal row commences with an elongated series of punctures but its length varies in different individuals and even on the two sides of the same individual. Elytra a little expanded behind the middle and rounded posteriorly.

Underside.—Shining, ferrugineous with epipleurs, prosternum (except the process which is pitchy) and anterior legs testaceous. Apex of meta-femora and meta-tarsal segments testaceous with hind borders of the latter and base of femora pitchy. Meta-tibia black, their spurs bifid and their outer face devoid of spines or spiniferous punctures. Prosternum very incrassate in front of anterior coxae and the process finely bordered, a little narrowed between the coxae, then broadly lanceolate. Episternal sutures not much curved and meta-sternal wings expanded before the apex. Meta-sternal epimera partially visible. Coxal lines short and turned outwards, cutting off a rather narrow supra-articular border. Coxal processes each with a group of punctures near their junction. Anterior and intermediate femora with a few rather long spiny hairs.

Male.—Anterior tarsi with first three segments enlarged and flattened, forming a more or less oblong palette with basal fringing hairs and stouter peripheral spines. Underside of each palette provided with three widely spaced large basal suckers and some (about 14) small ones more anteriorly placed. Claws equal and evenly curved. Intermediate tarsi provided beneath with two rows of very small suckers. Aedeagus with parameres as in *Aethionectes* and median lobe deeply bifid at apex (fig. 4).

Female.—Anterior quarter of disc of elytra provided with a coarse punctuation superimposed on the normal. Last visible abdominal sternite truncate.

Holotype ♂, allotype ♀, E. Cape Province : Cathcart, 3.iv.1955. Queenstown, 4.iv.1955, 3 ex ; Molteno, 8.iv.1955, 8 ex.; Indwe, 5.v.1955, 1 ex.; Tarkastad, 6.v.1955, 1 ex.

The types will be deposited in the British Museum (Natural History), London.

The colour and shape of this species are very similar to those of *Eretes*. The pronotum, however, is not bordered, and is shorter and wider, whilst the reduction of the head in front of the eyes is not so extreme and the elytra are less expanded behind and not serrate nor sinuate at the apex. It is more elongate, less abruptly narrowed in front and less expanded behind than typical *Aethionectes* species. The epipleurs are narrow but wider at the shoulders than in *Eretes*, leaving the meta-sternal epimeron partly visible ; more so than in *Aethionectes* but less so than in *Eretes*. The absence of spines or spiniferous punctures on the outer face of the meta-tibia is atypical in the Thermonectini and the long row of bifid spines on the inner face approximates more closely to the condition in the Hydaticini.

Acknowledgment.

I acknowledge with gratitude a bursary and a travelling grant from the South African Council for Scientific and Industrial Research without which the work on the Eastern Province Dytiscidae could not have been undertaken.

Reference.

Müller, G., 1942, Nuovi Coleotteri Dell'Africa Orientale (seconda serie) Dytiscidae. *Atti Mus. Stor. nat. Trieste* **15** : 74–75.

A NEW SPECIES OF *MIMEUTERMES* FROM THE GOLD COAST (ISOPTERA : NASUTITERMITINAE).

By W. A. Sands, M.Sc., F.R.E.S.
(*Colonial Termite Research Unit.*)

Mimeutermes edentatus sp. n.

Soldier.—Head capsule yellow, with nose yellow-brown, the colour changing gradually. Head, seen from above, pear-shaped, with short shallow groove along the median line posterior to the base of the nose ; posterior part of epicranial suture just visible ; in profile,

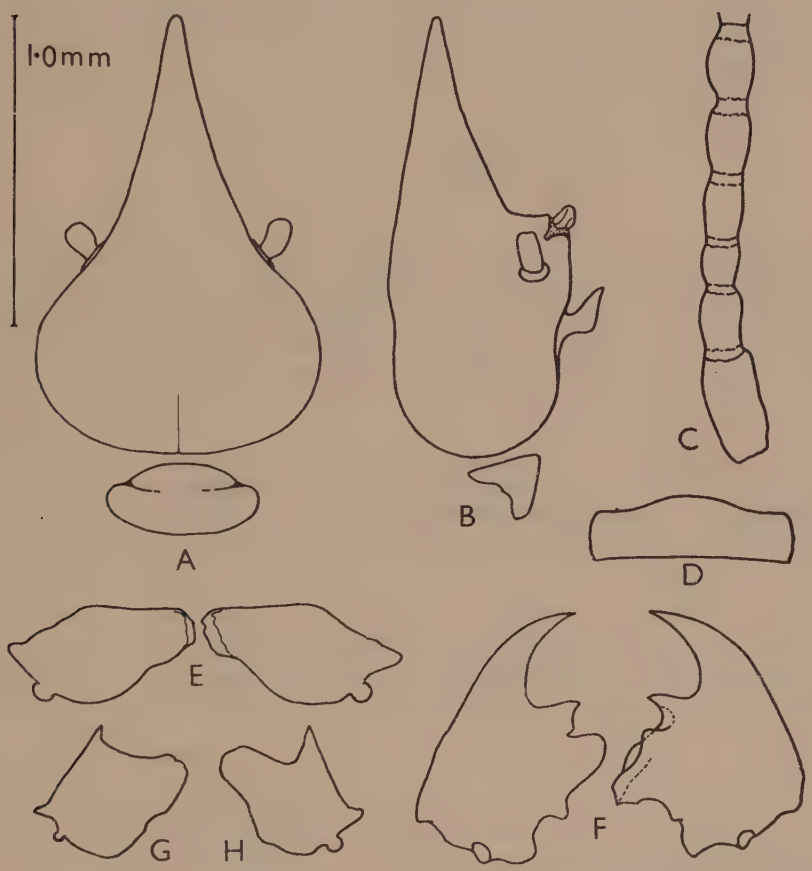


Fig. 1.—*Mimeutermes edentatus* sp. n. A–E, Soldier : A, head and pronotum from above ; B, lateral view of same ; C, basal six segments of antenna ; D, labrum ; E, mandibles. F, Worker, mandibles. G and H, Soldier mandibles of *M. sorex* Silvestri and *M. giffardii* Silvestri respectively for comparison with E. (after Silvestri, 1914).

base of nose swollen above line of head capsule; hind margin of the base of antenna distinctly nearer the back of the head (ratio 2 : 3 exactly). Cuticle of nose markedly more rugose than rest of head capsule; head and nose with scattered short setae. Antennae pale yellow, with 12 segments, II and IV subequal, III slightly shorter and V slightly longer than these. Mandibles pale yellow, darker at molar surfaces, reduced to simple lobes, completely lacking any " points " (i.e. vestiges of apical and marginal teeth).

Pronotum same colour as head, saddle-shaped; anterior lobe large, margin evenly curved, not emarginate or sinuate. Legs also uniform pale yellow.

	mm.
Length of head . . .	1·46
Width of head . . .	0·95
Width of pronotum . . .	0·49
Length of pronotum . . .	0·25
Length of hind tibia . . .	0·63

Worker.—Head a broad oval, pale yellow; mandibles pale with articulations and cutting edges darker reddish-brown. Antennae almost white, with 13 segments.

Pronotum with very long anterior lobe, evenly rounded and not emarginate. Thorax, legs, and abdomen almost white.

	mm.
Width of head . . .	0·81
Width of pronotum . . .	0·44
Length of hind tibia . . .	0·62

Differs from both *M. giffardii* Silvestri and *M. sorex* Silvestri (1914, *Boll. Lab. zool. Portici* **9** : 3–146) in the complete loss of the " point " or tooth from the reduced soldier mandibles, and in the abrupt change of contour of the head capsule at the base of the nose seen in the profile of the head. The head is much wider and tapers more sharply to the base of the nose, as seen in plan view. The front margin of the pronotum is evenly rounded and not sinuate as in the other two species.

Described from one soldier and a number of workers. Immature forms of all castes, and a tertiary reproductive form, are also present.

Holotype: soldier. British Museum (Natural History).

Type locality: Gold Coast: Accra (*A. W. J. Pomeroy*, B.M. 1929—358).

Acknowledgment.

Thanks are due to the Trustees of the British Museum (Natural History) for permission to examine the specimens described above.

A NEW BRITISH SPECIES OF *LIPAPHIS* MORDVILKO, 1928 (HOMOPTERA : APHIDIDAE).

By F. H. Jacob, F.R.E.S.

(*Ministry of Agriculture, Fisheries and Food, Plant Pathology Laboratory, Harpenden.*)

Doncaster (1954) reviewed the status of *Lipaphis* Mordvilko, 1928, and devised a key to the known species. Reference to this work and the examination of material under Mr. Doncaster's care at the British Museum (Natural History) convinced the writer that a species found on *Cochlearia officinalis* L. was distinct from any previously described.

Following Doncaster's (1954) classification, *Lipaphis cochleariae* sp. n. falls into the subgenus *Lipaphis* Mordv. s.s. It resembles *L. turritella* Wahlgren and *L. rossi* Börner in that the abdominal and thoracic tergites are pigmented, although there is great variation in the extent of pigmentation : the siphunculi are also dark, but differ in not being markedly expanded at the base.

Lipaphis cochleariae sp. n.

Apterous viviparous female.

Living specimens : Body dull olive green with conspicuous brownish sclerotic terga. There was appreciable variation in the colonies observed and in some specimens the terga were not strongly contrasted with the rest of the body. This ornamentation is very conspicuous in the young larvae. Antennal segments I and II very dark ; base of III light and rest of antenna dark. Eyes black ; siphunculi dark ; cauda the same colour as body ; venter light brown to olive green. The aphids are somewhat waxy and the dorsal cuticle markedly rugose.

Macerated specimens : Head sclerotic, deeply pigmented, with prominent frontal tubercles and a broad, fairly deep convex median process. Basal two-thirds of antennal joint III light, but remainder of antenna strongly pigmented. Antenna less than half as long as body : basal part of sixth joint often expanded distally and at its thickest about twice as thick as the processus terminalis. There is considerable variation in the relative lengths of the antennal joints. In the series of measurements given in Table I, III is 1·69–2·84 (mostly 1·75–2·5) times as long as IV, 1·045–1·46 (mostly 1·25) times as long as the processus terminalis and 1·15–1·64 times as long as the siphunculi ; V is 0·875–1·27 (mostly nearly equal) times as long as IV ; the processus terminalis is 1·76–2·48 (mostly 2–2·33) times as long as the base of VI. Antennal hairs sparse, short and inconspicuous.

Rostrum reaches beyond base of second coxae, but not as far as the third ; it is rather thick and blunt, the apical joint being about twice (1·73–2·27 times) as long as its basal width and generally slightly shorter than the second tarsal joints of the hind legs (second tarsal joints 0·88–1·18, mostly 1·1 times as long). Apical joint of rostrum has four hairs in addition to the preapical group.

Legs moderately pigmented with coxae and tarsi darker and bases of femora lighter than the remainder. Siphunculi dark, weakly imbricated with a few marked striations immediately before the flange. They vary in shape and may be somewhat swollen, but are generally cylindrical, tapering fairly strongly in the distal quarter of their length. Siphunculi 1·09–1·47 times as long as cauda. Cauda dark and tapering to a blunt point, but there is a marked variation in shape and some specimens show a distinct basal constriction. There are characteristically five caudal hairs, two pairs and a single dorsal subapical hair.

TABLE I.—*Measurements of apterous viviparous females examined (in millimetres).*

	Body length.		Length of antennal joints. III.	IV.	V.	VI.	Length of siphunculi.	Length of cauda.	Apical joint of rostrum. Length.	Breadth.	Hind tarsus II.
1	1·69	R	·254	·129	·146	·107+·206	·189	·142	·107	·052	·112
		L	·245	·125	·133	·103+·206	·185	.	.	.	·115
2	1·59	R	·211	·086	·103	·082+·163	·168	·129	·095	·056	·103
		L	·202	·086	·099	·077+·163	·159	.	.	.	·103
3	1·86	R	·258	·115	·125	·099+·206	·185	·146	·107	·052	·115
		L	·258	·125	·120	·095+·206	.	.	.	.	·120
4	1·73	R	·258	·120	·120	·090+·198	·181	·129	·107	·052	·115
		L	·267	·115	·112	·095+·202	·176	.	.	.	·115
5	1·63	R	·224	·120	·129	·090+·211	·181	·150	.	.	.
		L	·228	·120	·115	·099+·206	·172	.	.	.	·115
6	1·61	R	·288	·150	·138	·103+·219	·193	·159	·107	·056	·125
		L	·292	·155	·138	·103+·206	·193	.	.	.	·125
7	1·90	R	·275	·150	·155	. .	·211	·172	.	.	·125
		L	·271	·150	·150	·095+·232	·211	.	.	.	·125
8	1·59	R	·262	·155	·138	·103+ .	·176	·150	·099	·047	·115
		L	·258	·129	·125	·095+ ·211	·176	.	.	.	·115
9	1·59	R	·236	·133	·120	·090+·202	·189	·146	·103	·056	·115
		L	.	.	.	. .	·193	.	.	.	·103
10	1·88	R	·258	·133	·138	·107+·202	·215	·159	·112	·060	·125
		L	·267	·138	·138	·112+·215	·215	.	.	.	·125
11	2·00	R	·314	·172	·163	·112+·215	·215	·168	·112	·064	·129
		L	·318	·172	·150	·115+·232	·206	.	.	.	·125
12	1·84	R	·262	·159	·150	·103+·249	·202	·150	·112	·056	·125
		L	·275	·142	·146	·099+·245	·202	.	.	.	.
13	1·92	R	·236	·115	·129	·099+·202	·198	·163	·103	·060	·120
		L	.	.	.	. .	·198	.	.	.	·120
14	2·06	R	·258	·129	·129	·095+·206	·206	·172	·103	·064	·120
		L	.	.	.	. .	·202	.	.	.	·120
15	1·63	R	·275	·120	·115	·103+·215	·189	·163	·099	·052	·112
		L	·262	·112	·120	·090+·198	·193	.	.	.	·112
16	1·41	R	·236	·095	·103	·082+·176	·172	·142	·107	·047	·112
		L	·206	·095	·107	. .	·172	.	.	.	·115
17	*1·59	R	·297	·064	·099+·181	. .	·181	·138	·107	·056	·112
		L	·284	·115	·090+·193	. .	·181	.	.	.	·115
18	1·45	R	·254	·107	·115	·095+·181	·172	·150	·103	.	·115
		L	·241	·107	·115	·090+·185	·172	.	.	.	·112
19	1·65	R	·249	·107	·107	·090+·193	·202	·138	·099	·052	·112
		L	·249	·107	·115	·090+·193	·181	.	.	.	·115
20	1·65	R	·245	·099	·115	·090+·185	·172	·146	·112	·052	·107
		L	·245	·082	·103	·086+·185	·176	.	.	.	·107
21	1·18	R	·193	·090	·095	. .	·159	·142	·095	·052	·112
		L	·206	·099	·103	·086+·185	·163	.	.	.	.
22	1·49	R	·215	·095	·103	·086+·185	·172	·150	·107	·052	.
		L	·215	·090	·099	·086+·176	·168	.	.	.	.

TABLE I.—*Measurements of apterous viviparous females examined (in millimetres)*—continued.

	Body length.		Length of antennal joints. III.	IV.	V.	VI.	Length of siph-unculi.	Length of cauda.	Apical joint of rostrum. Length.	Breadth.	Hind tarsus II.
23	1·53	R	·215	·082	·099	·086+ –	·163	·133	·112	·056	.
		L	·198	·090	·095	·090+·159	·159	.	.	.	·099
24	.	R	·211	·082	·095	·082+·155	·159	·146	·099	·047	.
		L	·202	·077	·095	·082+ .	·163	.	.	.	·095
25	1·61	R	·198	·090	.	. .	·172	·138	·107	·056	·107
		L	·198	·103	·112	·086+·189	·172	.	.	.	·107
26	1·55	R	·228	·103	·112	. .	.	·150	·103	·060	·112
		L	·228	·112	·115	·086+·181	·172	.	.	.	·107
27	1·63	R	·236	·103	·103	·086+·181	·185	·150	·103	·052	·107
		L	·236	·112	·107	·090+·181	·185	.	.	.	·107
28	1·35	R	·215	·120	·115	·086+·193	·172	·146	·099	·047	·103
		L	.	.	.	. .	.	.	.	.	.
29	1·49	R	.	.	.	. .	·163	·142	·103	·056	·099
		L	.	.	.	. .	·163	.	.	.	·099
30	1·71	R	·279	·138	·150	·099+ .	·211	·150	·112	·060	·120
		L	·292	·138	·155	·107+·206	·202	.	.	.	·115
31	†1·77	R	·236	·095	·115	. .	·198	·155	·103	·056	·115
		L	·249	·107	·142	. .	·202	.	.	.	·115
32	1·71	R	·232	·107	·112	·090+·172	·172	·138	·107	·056	·120
		L	·224	·120	·120	·090+·189	·172	.	.	.	·115
33	1·45	R	·215	·095	·095	·086+·181	·172	·142	·103	·052	·103
		L	·215	·090	·103	·086+·168	·168	.	.	.	·107
34	1·61	R	·267	·107	·107	·095+·206	·181	·159	·112	·060	·107
		L	·279	·115	·125	·090+·193	·181	.	.	.	·115
35	1·49	R	·228	·090	·107	·086+·168	·181	·150	·107	·056	·112
		L	·236	·120	·115	·086+·189	·176	.	.	.	·112

* = 5-jointed antenna. IV with primary rhinarum—L with partial division and aberrant V.

† Abnormal antenna.

Eighth abdominal tergite crescent-shaped—convex in front—with comb-like imbrications and four inconspicuous blunt or semi-capitate hairs along the hind margin. There are similar spinal and marginal hairs on other tergites, but the dorsal hairs as a whole are small and inconspicuous.

Large pigmented areas present on seventh tergite and smaller ones on the sixth ; otherwise abdominal pigmentation very variable, ranging from small isolated areas to large paired patches which do not, however, coalesce medianly. There are large dorsal and lateral patches on the thorax. Stigmal plates slightly tubercular, although this characteristic tends to be obscured in mounting. In this *L. cochleariae* resembles *Staticobium limonii* (Contarini), a species which is also liable to be submerged in muddy water. Hille Ris Lambers (1939) discusses this feature of *S. limonii* where it is much more marked.

There are small marginal tubercles on the prothorax. Dorsal cuticle indistinctly reticulated. Chaetotaxy of first tarsal joints 3.3.2.

First instar larva : Pale greenish-yellow, becoming darker and waxy, resembling adult. Antennae four-jointed, the third joint showing a pale ring at the point where the third and fourth joints will ultimately divide. Front of head strongly convex, with two out-

standing hairs; frontal tubercles small. Spinal and marginal hairs occur on prothorax; pleural hairs from metathorax to fifth abdominal segment. Cauda and anal plate each with two hairs. Apical joint of rostrum with three or four hairs in addition to the apical group. First tarsal joints two-haired. Stigmal plates appear to be slightly tubercular.

Types.—Holotype has been deposited in the British Museum (Natural History). Paratypes in the writer's and H. L. G. Stroyan's collection.

Distribution.—Known only from ANGLESEY: Church Island, Menai Bridge, *Cochleariae officinalis* L., 28.vi.45 (*F. H. Jacob*) and 29 and 30.vii.54 (*F. H. Jacob* and *H. L. G. Stroyan*).

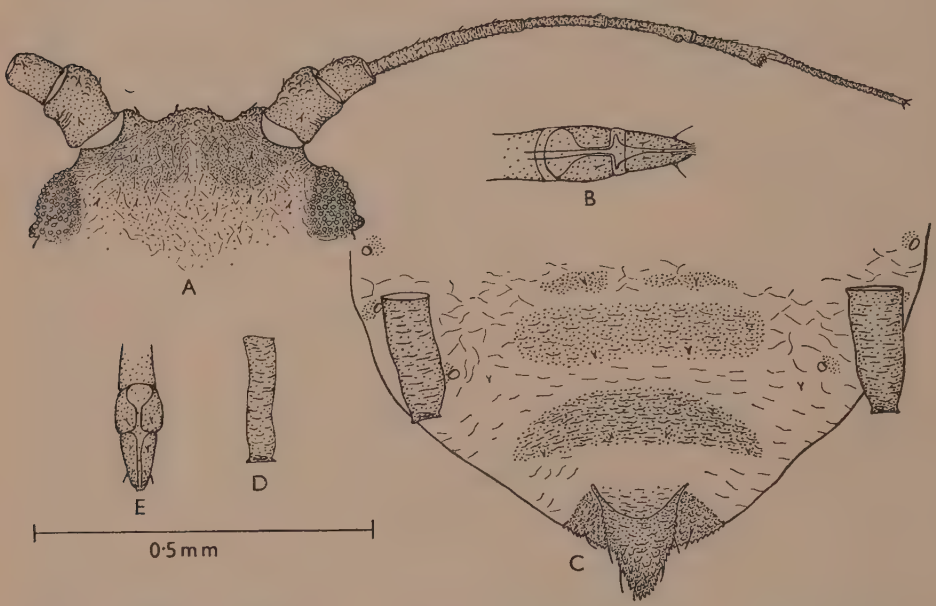


FIG. 1.—*Lipaphis cochleariae* sp. n. Apterous viviparous female. A, Dorsal side head and antenna; B, tip of rostrum (ventral); C, dorsal side of posterior end of abdomen; D, siphunculus of shape commonly seen; E, tip of rostrum of first instar larva (ventral).

Notes.—The shore of Church Island consists of a fairly narrow stony zone with a wide expanse of mud at low tide. *C. officinalis* grows amongst the stones to some distance below spring tide high-water mark and is frequently covered by sea-weed and other flotsam. *L. cochleariae* was found on plants underneath heaps of sea-weed, although it is not likely to be submerged for such long periods as *Chaitaphis suaedae* (Soliman), which also occurs on Church Island.

In June, 1945, the plants were flowering and the aphids were found only in the flower heads. At the end of July, 1954, seed-pods were well developed, but there were still a few flowers; some aphids were found in the heads, but most occurred in the rosettes of young plants.

The living aphids bear a rather striking resemblance to the larvae of *Phaedon cochleariae* (F.), which was common on the same plants.

Alatae have not been found and nothing is known of how *L. cochleariae* overwinters. Aphids collected for laboratory culture failed to survive.

The chaetotaxy of the first instar larva corresponds to the generic pattern described by Börner (1930), but provides one striking difference from that of Sampson (1946). Sampson examined *Lipaphis erysimi* (Kltb.) (Syn. *Rhopalosiphum pseudobrassicae* (Davis)) and states that on the apical rostral joint of *Rhopalosiphum* Koch, which in Sampson's classification would include *Lipaphis*, there are no bristles in addition to the apical group. In the context the terms " hair ", " bristle " and " setae " appear to be synonymous, so that in this character *L. cochleariae* is anomalous.

Acknowledgments.

The writer is grateful to Mr. J. P. Doncaster for the loan of specimens of *Lipaphis* spp. and to Mr. H. L. G. Stroyan for the loan of specimens for measurement.

References.

Börner, C., 1930, Beiträge zu einem neuen System der Blattläuse. *Arch. Klassif. phylog. Ent.* **1** : 115.

Doncaster, J. P., 1954, Notes on the genus *Lipaphis* Mordvilko, 1928 (Homoptera : Aphididae) and description of a new species. *Proc. R. ent. Soc. Lond.* (B) **23** : 83.

Hille Ris Lambers, D., 1939, Contributions to a Monograph of the Aphididae of Europe. II. The genera *Dactynotus* Rafinesque, 1818 ; *Staticobium* Mordvilko, 1914 ; *Macrosiphum* Passerini, 1860 ; *Masonaphis* nov. gen. ; *Pharalis* Leach, 1826. *Temminckia* **4** : 1.

Sampson, W., 1946, A generic classification of California aphids by means of first instar nymphs. *Univ. Calif. Publ. Ent.* **7** : 365.

Addendum

On 3.x.55 Messrs. H. L. G. Stroyan and J. P. Roberson found oviparous females, apterous males and eggs of *L. cochleariae* on *C. officinalis* growing in a muddy creek at Sea houses, Northumberland. This solves the overwintering problem and suggests that the species is likely to be widely distributed around our coasts where the habitat is suitable. Mr. Stroyan will describe the hitherto unknown forms.

A NEW GENUS AND SPECIES OF DRYINIDAE (HYMENOPTERA) FROM MAURITIUS.

By J. R. Williams, B.Sc., D.I.C., F.R.E.S.
(*Department of Agriculture, Mauritius.*)

Gonatopodinae.

Pseudogonatopoides gen. n.

Enlarged claw of chelate fore tarsus with a subapical tooth and a row of broad lamellae, fifth tarsal segment with two rows of broad lamellae and a distal group. Labial palpi with two segments (fig. 1); maxillary palpi with three segments, there being only one segment after the geniculation (fig. 2). Mandibles with four distinct teeth. Disc of pronotum divided from collar by a distinct transverse impression.

Type species: *Pseudogonatopoides mauritianus* sp. n.

Similar to *Pseudogonatopus* Perkins, 1905, but in that genus the maxillary palpi have four segments.

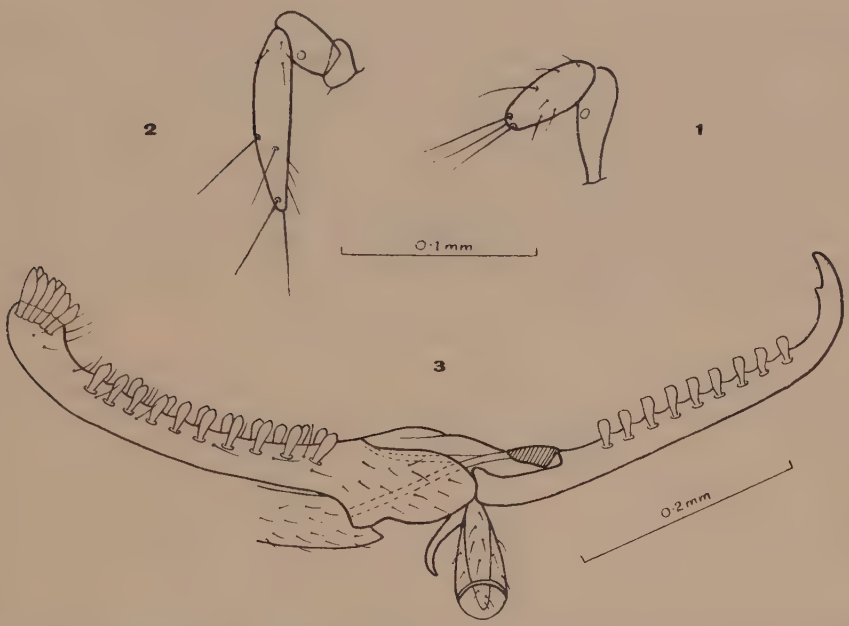
Pseudogonatopoides mauritianus sp. n.

Female.—Body testaceous, with vertex and abdomen darker, sometimes blackish; pronotum generally darker along posterior and lateral margins; mesonotum with a sharply defined black area in front; abdominal petiole black dorsally. Legs testaceous or flavo-testaceous, fore legs with club of femur sometimes dark brown. Antennae with segment 1 pallid or slightly testaceous, 2 testaceous, 3–8 black, 9 black but with a white or whitish patch of variable size distally, 10 white, immaculate. Body with pale, short, sparse hairs which are rather more numerous and longer on abdomen. Length 3·0–4·0 mm.

Vertex strongly excavated, deeply emarginate behind, alutaceous medially, especially in vicinity of ocelli, becoming finely reticulated near the eyes, central keel distinct. Ocelli small, posterior side of ocellar triangle half to two-thirds as long as the other two sides. Antennae with flagellum (segments 3–10) thickening distally, segment 1 curved, about half as thick again as 2 and as thick as the distal half of 4, slightly longer than 3 and 10, which are of equal length, and the next longest segments of the antennae. Pronotum much broader in front than behind, anterior margin a little emarginate, posterior margin bluntly acuminate medially, with strong transverse impression just within the anterior third of its length, disc about twice as long as wide and shining posteriorly becoming dull and alutaceous anteriorly, collar shiny with small, feeble, scattered punctures, sides of pronotum with longitudinal striae extending from posterior margin to above fore coxae. Mesonotum about as long as broad, shining in front, dull and alutaceous with faint longitudinal striations behind. Scutellum moderately well defined, alutaceous. Distinct transverse metanotal (?) depression behind scutellum. Meso-metapleural suture distinct. Mesopleuron with rather ill-defined transverse striae. Metathorax + propodeum about two-thirds as broad as long, sides converging slightly behind, dorsal surface shining with very few faint punctures, posterior surface and sides regularly and strongly transversely striate. Fore coxae nearly twice as long as broad; fore trochanters two-thirds as long as femora, curved, thickening distally; fore femora strongly clavate with stalk-like distal portion less than one-third thickness of club; fore tibiae gently curved and gradually swelling from the stalk-like proximal end; fore tarsi with segments 1 and 4 long and of nearly equal length and longer

than segments 2 and 3 combined, segment 3 with a short, stout, proximal, knob-like appendage with a few hairs at its tip. Chelae as in fig. 3, tarsal segment 5 bearing two rows of broad lamellae (9 + 7 or an approximation of those numbers), a group of about ten closely apposed lamellae at its apex, and with bristles interspersed irregularly among the lamellae ; enlarged claw with subapical tooth and a row of 7–10 broad lamellae along the middle of its length. Hind femora strongly clavate.

Male unknown.



Figs. 1–3.—Labial palp, maxillary palp, and chela respectively of *Pseudogonatopoides mauritianus* sp. n., ♀.

Type ♀, Mauritius : Palmyre, iii.1955, *ex* nymph *Perkinsiella saccharicida* Kirkaldy (*J. R. Williams*). The left fore tarsus, the left mandible, the labium and the maxillae are mounted in balsam.

Paratypes, 3 ♀, same data as type ; one has the mouth parts mounted in balsam, another has the fore tarsi and the mouth parts in balsam but the head is missing.

The type and paratypes are in the British Museum (Nat. Hist.).

The following are data regarding the number of lamellae on the chelae of the type material. The data are not complete for each specimen because the lamellae are difficult to count accurately unless slide mounts are made.

Type.—Left chela, claw with 8 lamellae, fifth tarsal segment with 10 + 6 lamellae.

Paratype 1.—Claws with 7 and 8 lamellae respectively.

Paratype 2.—Both claws with 10 lamellae.

Paratype 3.—Chelae with 9 and 10, 9 + 7 and 10 + 8 lamellae on claws and fifth tarsal segments respectively.

Biological Notes.

In addition to the above host record, *P. mauritianus* was bred from *Dicranotropis muiri* Kirkaldy, another sugar-cane Delphacid with habits very similar to those of *P. saccharicida*. Both hosts are very common upon sugar-cane in Mauritius.

Apparently only the nymphal stages of the hosts are parasitised and with *P. saccharicida* the parasite larva may complete its development and kill the host when the latter is in either the third, fourth, or fifth nymphal instar. The only specimen bred from *D. muiri* left the host when the latter was in the fifth nymphal stage. The larval sac is black and the integuments of which it is composed are finely sculptured. The position of the sac is usually in the pleural region between the fifth and sixth abdominal tergites. The mobile last stage larvae, when confined in specimen tubes, spun up on the corks and usually bit off pieces to incorporate in the cocoons. The pupal stage was of 18–24 days duration (March–April). Several individuals of *Cheiloneurus gonatopodis* Perkins (Encyrtidae) emerged from some of the cocoons, hyperparasitism having occurred presumably while enclosed in the larval sacs on the bodies of the leafhoppers.

A NEW SPECIES OF *ANASTATUS* MOTSCHOULSKY (CHALCIDOIDEA : EUPELMIDAE) FROM KASHMIR.

By R. N. Mathur, M.Sc., Ph.D., F.E.S.I., F.R.E.S.

(*Systematic Entomologist, Forest Research Institute, Dehra Dun.*)

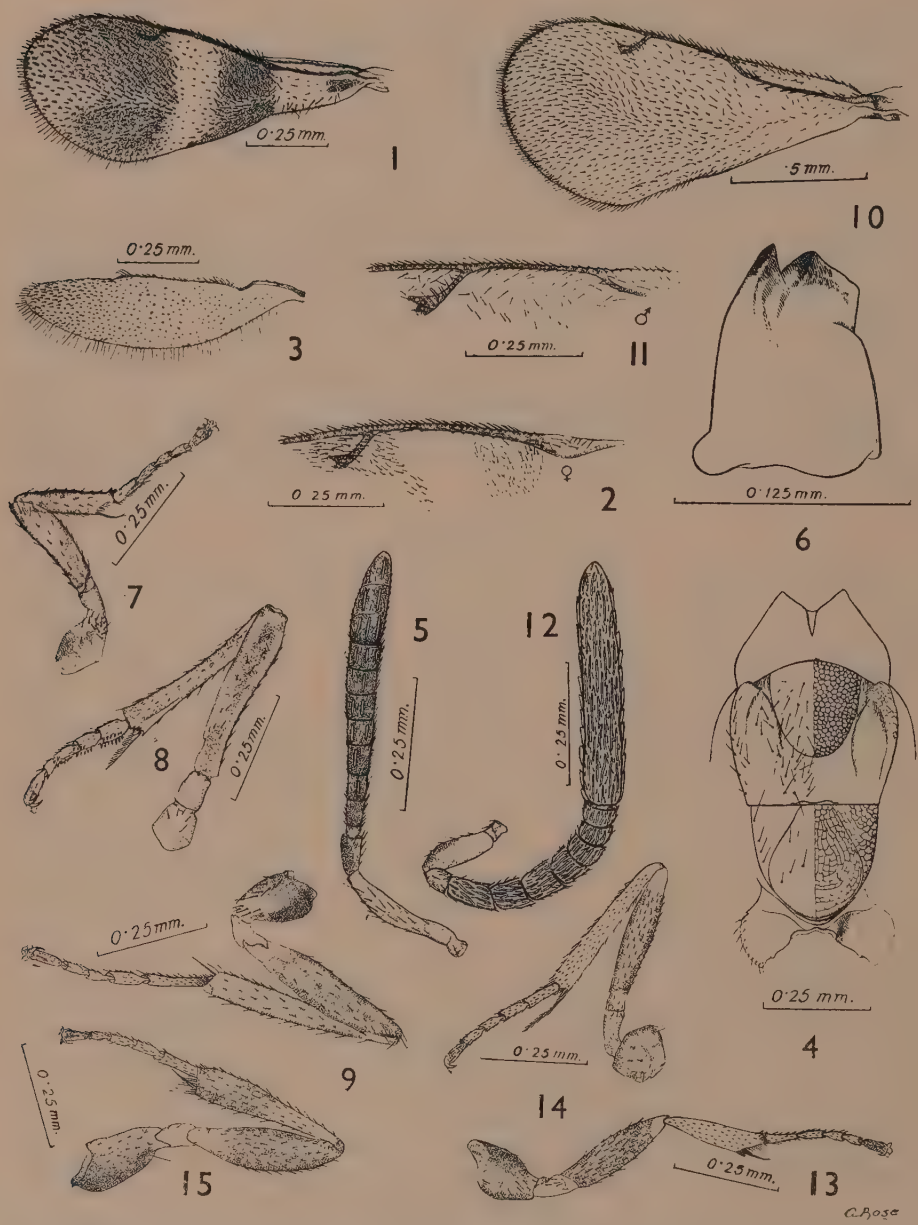
The long series of specimens on which this species is based was bred from the egg-masses of *Lymantria obfuscata* Walker (Lymantriidae) collected from the Haran Plantation, Srinager, Kashmir, between 28th July and 3rd August, 1952. *L. obfuscata* is a serious defoliator of *Salix alba* and *S. fragilis*, occurring annually and causing considerable damage to willows. These Chalcid wasps emerged from the egg clusters during August and September, 1952, and again in March and April, 1953, at Dehra Dun, revealing the maximum emergence during August. The males were far more numerous than the females. From 12,578 eggs only 415 parasites emerged, indicating 3·29 percentage of parasitism. This wasp is new to science and is described as *Anastatus kashmirensis* sp. n.

Anastatus kashmirensis sp. n.

Female.—Length about 1·5 to 2 mm. Head shining green with a coppery tinge, frons and face with purplish sheen ; antennae with scape brownish-yellow, pedicel shining green, funicle and club dark brown ; mandibles dark brown apically. Prothorax shining blue with a dorsal median orange stripe, brownish-yellow laterally ; mesothorax metallic bluish-green with a purplish reflection, mesopraescutum and scutellum with a coppery tinge ; propodeum shining purplish ; pro- and mesosternum shining bluish-green ; mesopleurae fuscous with purplish tinge anteriorly and testaceous posteriorly. Fore-leg with coxa, trochanter and three middle tarsal segments brownish-yellow, coxa partly greenish outwardly, femur, tibia, basal and apical tarsal segments dark brown ; middle and hind legs with coxae, femora, tibiae and apical tarsal segments dark brown. Wings iridescent, strongly infumated in the apical half, and again in centre and at base in the basal half ; in between hyaline bands present ; the apical smoky band a little lighter towards apex. Abdomen aeneous with a broad dull white band on two basal segments, first basal segment with two dark brown lateral spots, terminal portion of abdomen with dark green sheen. Ovipositor sheath pale.

Head about 0·5 mm. wide, broader than long, vertex and front roughened and finely granular ; antennal furrows moderately deep, strongly defined by a carina laterally and dorsally, face elevated and rugulose between the antennal furrows ; anterior ocellus slightly above the antennal furrows, lateral ocellar line greater than the ocellocular line, posterior ocellar line greater than the lateral ocellar line, ocelloccipital line greater than the posterior ocellar line ; occipital carina fine, evenly rounded above, not attaining top of vertex ; entire surface sparsely beset with small setae.

Antennae inserted at level of lower extremities of eyes, about 0·95 mm. long, bearing fine setae ; scape elongate and narrow, not extending to anterior ocellus, about as long as pedicel, annulus and the first three funicular segments together ; pedicel as broad as the scape, about twice as broad as long, and about one-third as long as the scape ; annulus small, not broader than pedicel ; 7 funicle segments, first segment longer than broad and slightly smaller than pedicel, second the same size as the first, third slightly longer than second, following segments slightly smaller in length, fourth almost quadrate, fifth, sixth and seventh of equal size, and broader than long ; club with three segments, much broader and about half as long as the funicle, apex narrow, the sutures between segments weak ; funicular segments 2 to 7 and club longitudinally striate.



FIGS. 1–15.—*Anastatus kashmirensis* sp. n. (male and female). (1) Fore wing of female; (2) stigma of fore wing (enlarged); (3) hind wing of female; (4) thorax of female; (5) antenna of female; (6) mandible of female; (7)–(9) legs I, II, III of female; (10) fore wing of male; (11) stigma of fore wing (enlarged); (12) Antenna of male; (13)–(15) legs I, II, III of male.

Mandibles bidentate, ventral tooth short and acute, dorsal tooth broad with an oblique, straight edge.

Thorax about 0·9 mm. long and 0·5 mm. wide, sparsely beset with setae, as wide as head, slightly shorter than abdomen ; prothorax, when viewed from above, somewhat triangular in shape, slightly broader than long, with the anterior angle greatly invaginated, mesothorax depressed, mesopraescutum punctate and closely honeycomb-like reticulate with fine impressed lines, scapulae weakly reticulate anteriorly, scutellum and axillae finely longitudinally striate, axillae separated ; mesopleurae large, entire, finely lineolate, sparsely hairy anteriorly ; propodeum extremely short in the middle, broad laterally.

Wings about 1·35 mm. long and 0·5 mm. broad, slightly more than twice as long as broad, with a central, curved, transverse hyaline band about middle of marginal vein, marginal vein nearly as long as the submarginal vein, postmarginal vein about half as long as marginal, stigmal vein slightly less than half as long as postmarginal, both the margins of the central hyaline band somewhat irregularly curved. Hind wings hyaline, with three curved setae.

Legs long and slender, sparsely beset with setae ; fore leg with femur curved, slightly longer than tibia, tibia with two small, dorsal, apical teeth and a long, ventral, subapical spur, bifid at tip ; middle leg with femur as long as tibia, tibia narrower than femur, thickened at apex, with four small teeth at apical ventral angle and a long, stout, ventral spur dilated at base ; tibial spur much longer than metatarsus, tarsal segments 1 to 4 with small, black, ventral teeth arranged in lateral rows, teeth diminishing in number from metatarsus onwards ; hind leg with femur shorter than tibia, tibia curved, about as long as all the tarsal segments combined, tibial spur about half as long as metatarsus.

Abdomen about 1·15 mm. long, sparsely beset with setae, slightly longer than thorax, narrow at base, widest at the fifth segment, and again strongly narrowed to the hind end, finely reticulate with impressed lines, both dorsally and ventrally. Ovipositor slightly exserted.

Male.—Length 1·25 to 1·75 mm. Head with vertex and face, thorax metallic bluish-green, vertex and scutellum with purplish sheen ; antennae dark brown with scape yellowish ventrally and basally ; legs with femora dark brown with bluish-green sheen, fore and middle tibiae and all tarsi yellowish, hind tibia yellowish in basal half and brownish in apical half ; abdomen aeneous-black with bluish-green sheen in basal segments ; wings hyaline, iridescent.

Head about 0·45 mm. wide, broader than long, roughened, sparsely hairy ; antennae inserted slightly above lower margin of eyes, about 1·15 mm. long, thicker, with ten segments, coarsely hairy, scape short and thick, not extending to anterior ocellus, about three times longer than wide, pedicel small and as wide as scape, funicle with 7 segments, first segment longer than others, twice as long as broad, twice as long as pedicel, second and third segments of equal size, almost quadrate, following segments gradually decreasing in length, fourth and fifth equal, broader than long, sixth and seventh transverse, about twice as broad as long ; club very long, elongate, longer than funicular segments and pedicel combined, all funicular segments and club with long, prominent striae. Mandibles as in female.

Thorax about 0·6 mm. long, about as wide as head, coarsely hairy, convex ; mesothorax with scutellum and axillae finely reticulate with impressed lines, parapsidal furrows distinct and complete, propodeum small, transverse, with a weak median carina.

Wings about 1·3 mm. long, 0·63 mm. broad, nearly twice as long as broad, marginal vein smaller than the submarginal, postmarginal nearly half as long as marginal, stigmal vein slightly curved, shorter than half postmarginal.

Legs coarsely beset with setae, femora of fore and hind legs slightly swollen, fore leg with femur slightly longer than tibia, tibia with two apical teeth and a long ventral spur, middle and hind legs with femora and tibiae of equal length.

Abdomen about 0·95 mm. long, much narrower but longer than thorax.

Holotype ♀ (22.viii.52), allotype ♂ (22.viii.52), and a long series of paratypes (30 ♂, 14 ♀), Kashmir : Haran Plantation, Srinager, reared from the egg-masses of *Lymantria obfuscata* Walker, viii–ix.1952 and iii.iv.1953, (*R. N. Mathur* Coll.). In addition a very long series of both males and females preserved in spirit (Tube No. 19898).

Anastatus kashmirensis is distinctly characterised by the metallic bluish coloration of the body, brownish-yellow to dark brown legs and antennae, and the relative length of the antennal segments. It differs from *A. blattidarum* Ferrière (1930, 1935) in general coloration, in possessing a small smoky band near the extreme base of the forewing (female) and in the proportions of the antennal segments (female and male). In the male the antenna is thicker, 10-segmented, with a very long, elongate club. In the female of *A. blattidarum* the scape is as long as the annulus and the first three funicular segments combined, the club is nearly as long as the last three funicular segments ; the outer margin of the hyaline band in the forewing is angulated in the middle ; while in the male the antenna consists of 11 segments, with the seventh funicular segment subquadrate and the club as long as the last three funicular segments together. Similarly, from *A. colemani* Crawford (1912) it is clearly distinguishable by its smaller size, the form of the antennae and the width of the hyaline band in the wings (female). In female specimens of *A. colemani* the first segment of the funicle is almost twice as long as the pedicel ; segments 2–5 decreasing successively in length, segments 6 and 7 subquadrate ; the club is about as long as the first segment of the funicle ; the curved hyaline band in the wings is as wide as the length of the stigmal vein. The male of *colemani* is unknown.

The new species is also easily distinguished from *A. bangalorensis* Mani and Chandy Kurian (1953) by the coloration of the legs, the position of the transverse hyaline stripe in the forewing and by the form of the antennae (female). In *A. bangalorensis* (female) the antenna with the first funicular segment is as long as the pedicel, and the club equal to the last three funicular segments combined ; the hyaline band of the forewing is somewhat straight, not curved and its outer margin commences from the marginal vein, well interior to the junction of the stigmal vein.

Mani (1938) has catalogued *Anastatus coimbatorensis* Girault (?) and *Anastatus* sp. from Coimbatore, but their descriptions have never been published. Again Pruthi and Mani (1940) have recorded two species of *Anastatus* from the eggs of *Lixus truncatulus* Fab. (*Amaranthus* weevil) at Pusa. They are also not specifically described.

Summary.

A detailed description of *Anastatus kashmirensis* sp. n. is given, with comparative taxonomic notes on the Indian species of *Anastatus*. The species is an egg-parasite of *Lymantria obfuscata* Walker (Lymantridae)—a serious defoliator of willows (*Salix* spp.) at Kashmir.

References.

Crawford, J. C., 1912, Descriptions of new Hymenoptera, No. 4. *Proc. U.S. nat. Mus.* **42** : 6–7.

Ferrière, Ch., 1930, On some egg-parasites from Africa. *Bull. ent. Res.* **21** : 33–34, fig. 1 *a*, b.

——, 1935, Notes on some bred exotic Eupelmidae (Hym., Chalc.). *Stylops* **4** : 150.

Mani, M. S., 1938, *Catalogue of Indian Insects.* Part 23 : Chalcidoidea, p. 84. Govt. of India, Delhi.

—— and Chandy Kurian, 1953, Descriptions and records of Chalcids (Parasitic Hymenoptera) from India. *Indian J. Ent.* **15** : 13–14, figs. 41–46.

Pruthi, H. S. and Mani, M. S., 1940, Biological notes on Indian Parasitic Chalcidoidea. *Misc. Bull. Imp. Counc. agric. Res., New Delhi* **30** : 12–13, figs. 22, 23, 24.

Book Notices.

Atlas of the scale insects of North America. Vol. VII. By G. F. Ferris. 4to. Stanford (Stanford University Pr.); London (Geoffrey Cumberlege), 1955. Pp. vi + 233, 94 text-figs. Price 60*s*.

Publication of this Atlas was begun in 1937 and the previous six volumes have dealt with the scale insect families Diaspididae and Pseudococcidae.

The seventh volume covers the families Aclerdidae, Asterolecaniidae, Conchaspididae, Dactylopiidae and Lacciferidae. It follows the pattern of the earlier volumes, detailed recognition characters being given for each species, together with biological and distribution notes. Full illustration of the species (enlarged about sixty times) is a distinctive feature of the work.

One further volume remains to be published to accomplish the original plan of the atlas.

British Pyralid and plume moths. By Bryan P. Beirne. Sm. 8vo. London and New York (Frederick Warne & Co., Ltd.), 1954. Pp. 208, 16 pls. (col.), 189 text-figs. Price 21*s*.

Until the publication of the present volume there had been no comprehensive work on this group of moths for about fifty years, and an attempt has here been made to fill this gap in the literature.

The purpose of the book, as stated in the introduction, is to enable specimens of the moths of this group to be identified as far as possible without dissection or damage, to provide summaries of the available information on their habits, life histories and distributions in the British Isles, and to indicate aspects of their biologies which require investigation.

Coloured illustrations are given of all species, except a few rare immigrants and casual introductions, and these, with the keys, should be sufficient to identify the larger proportion of the species. Where this is not possible, text-figures of distinguishing characters are also given.

In conformity with the rest of the Wayside and Woodland Series, the use of technical terms has been kept to a minimum.

ON AN INTERESTING NEW SPECIES OF *TRIDACTYLUS* OLIVIER (ORTHOPTERA : TRIDACTYLIDAE) FROM SOUTH AFRICA.

By L. Chopard, D.Sc.
(*Muséum National d'Histoire Naturelle, Paris*)

AND

E. McC. Callan, Ph.D., F.R.E.S.
(*Rhodes University, Grahamstown, South Africa*).

The so-called pygmy mole-crickets of the family Tridactylidae are really not crickets at all, as their affinities lie with the short-horned grasshoppers. They can be regarded, perhaps, as small burrowing grasshoppers, exhibiting remarkable adaptations for a fossorial habit. Several species of the genus *Tridactylus* Olivier are known from the Ethiopian region, *T. capensis* Saussure being the common species in Southern Africa. This is a black species with bronze metallic reflections. It is associated with sandy habitats, especially near streams, and occurs in both inland and coastal areas. Recently an interesting pale, sand-coloured species was found by one of us (E. McC. C.) on the coast in the Port Alfred district, Eastern Cape Province, South Africa. This species is described below as *T. pallidus* Chopard sp. n.

T. pallidus is quite distinct from *T. capensis* in a number of structural characters (in having nine antennal segments instead of ten it differs from all other known species of *Tridactylus*), in its pale coloration, and in being a definitely smaller insect (*T. pallidus* has a body length of 4·5 to 5·0 mm. ; *T. capensis* 5·5 to 6·0 mm.). It also appears to be strictly coastal in distribution and to be completely different ecologically from *T. capensis*.

Credit for the original discovery of *T. pallidus* should go in all probability to Professor J. Omer-Cooper, who kindly informs us that he remembers collecting this species several years ago from Kleinemonde and other localities near Port Alfred. Professor Omer-Cooper also reports that he recalls seeing large numbers of individuals burrowing in sand that was definitely covered by the high tide. More recently Mr. A. C. Brown has made some interesting observations on this species. Mr. Brown found it at Kleinemonde occupying a limited area of coarse sand, in which area it was remarkably numerous, and reports that over a hundred specimens were taken in five minutes with a small net. He suggests that the occurrence of this species may be linked with the fact that fresh water seeps up through the sand in exactly the same area as that in which the insect occurs. This species has apparently also been found by Mr. Brown at one or two other coastal localities, in coarse sand and seemingly under the influence of fresh water.

The following observations on *T. pallidus* have been made by one of us (E. McC. C.) in South Africa. The first specimens were collected in 1951 at Kasouga, some ten miles south-west of Port Alfred. Subsequently material was collected in 1952 and 1953 at Kleinemonde, about ten miles north-east of

Port Alfred. In 1955 this species was found for the first time at Port Alfred. At each locality a river with a tidal estuary enters the sea. *T. pallidus* was found invariably colonising coarse sand on the edge of the estuary or so-called lagoon within a short distance from the sea. The strip of sand colonised usually occupied only a limited area and was covered by the high tide. At Kleinemonde fresh water seeps up through the sand in this area. This phenomenon is not uncommon on this part of the coast, and in low-lying areas, sometimes between sand dunes, fresh water may occur just below the surface of the sand. It would be extremely interesting if the distribution of this species is limited to such areas with sub-surface fresh water.

T. pallidus is most strikingly sand-coloured, matching its sandy surroundings very closely. The insects are remarkably difficult to see against the sand, and, even when movement betrays the presence of numerous individuals, it appears rather as if the sand itself is in motion. When disturbed they either burrow rapidly into the sand or jump distances up to about two feet. Should they alight on the surface of the lagoon, they have no difficulty in regaining the sand, jumping with facility from the surface of the water, probably aided by the lamellae of the hind tibiae. When the high tide covers the area of sand colonised, which may often be for about an hour or more, the insects retreat within their burrows, and, when the tide recedes, they emerge again apparently none the worse for submergence.

T. pallidus may occur in immense numbers in suitable areas. In this respect it differs from *T. capensis*, which does not seem to be found in anything like comparable numbers. On 13th March, 1955, at Port Alfred 580 individuals of the former species, the majority of which were adults, were captured in about five minutes by sweeping close to the sand with a small hand net. In an attempt to assess the sex ratio, 100 adults were examined, but all were females. The absence of males may be due either to their being too agile to be caught by the net or to the fact that at this time of the year (towards the end of summer) populations consist solely of females. That the latter explanation may be the true one is suggested by the fact that of about a dozen individuals captured separately in glass vials on this date all were females.

Tridactylus pallidus Chopard sp. n.

Male.—General habitus of species of the genus *Tridactylus*; general shape rather short and wide; coloration whitish with a few weak light brown spots. Head whitish; frontal rostrum very wide, projecting, subangulate in the middle; labrum brown. Eyes large, black; ocelli small, whitish, feebly visible. Antennae comprising nine segments, light brown in colour, except the third segment which is white; third segment longer and narrower than second; fourth and fifth almost as long and wide as second; sixth to eighth a little longer, equal in length; ninth ovoid (fig. 2). Palpi white, very feebly darkened at apex; fourth segment of the maxillary palpi a little shorter than third, fifth equalling third; second segment of labial palpi a little longer than third, compressed.

Pronotum strongly convex, with feebly concave anterior margin, sides and posterior margin regularly rounded; coloration whitish, with a brown median line, divided towards the anterior margin. Abdomen compressed, whitish; first, second and tenth tergites darkened; second tergite bearing a small median tubercle, followed by a rather deep depression (fig. 3); posterior margin of this tergite membranous, feebly notched, forming two small triangular lobes; tenth tergite furrowed in the middle, posterior margin concave, with somewhat projecting angles; epiproct quadrangular, with acute angles; paraprocts

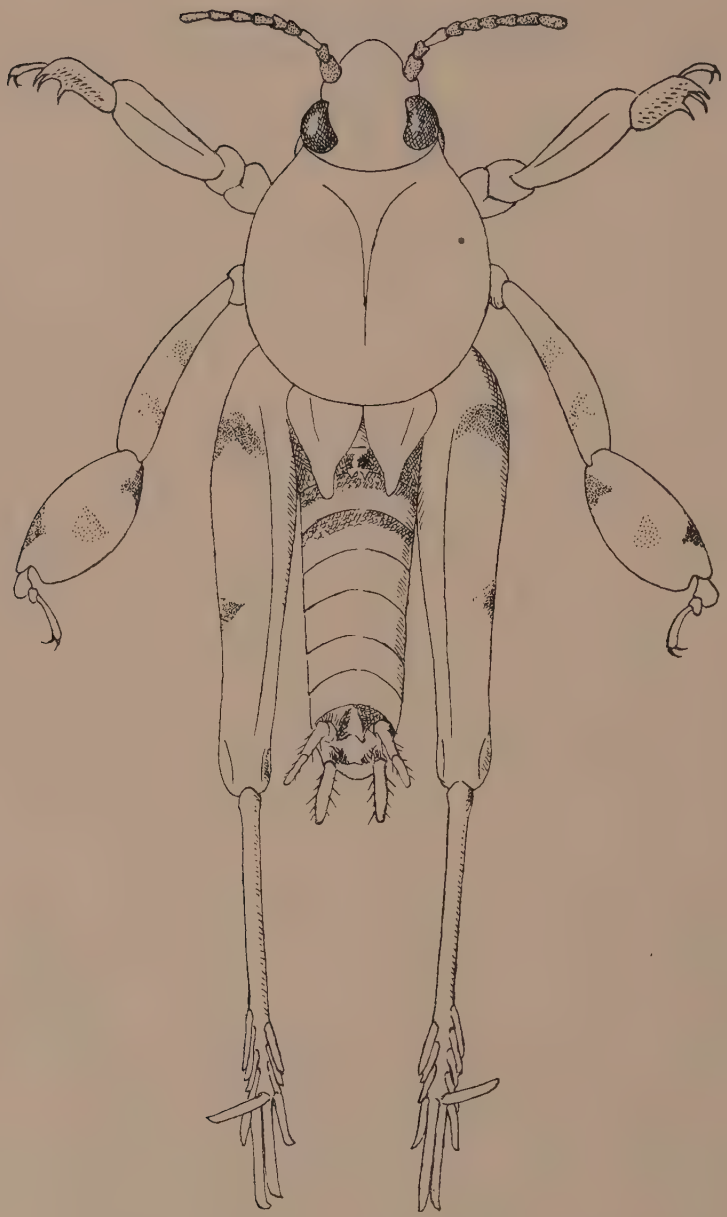
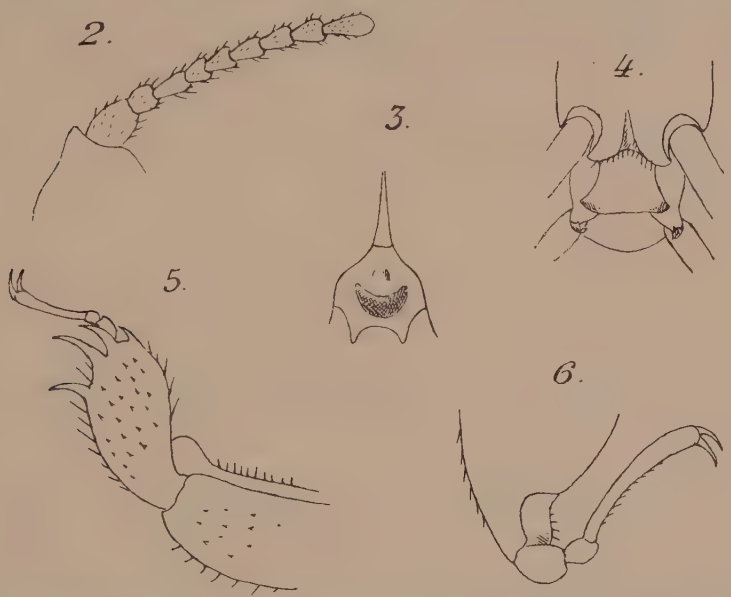


FIG. 1.—*Tridactylus pallidus* Chopard sp. n. Male

bearing, beside the process, a small brown plate turned sharply upwards (fig. 4); lower surface of abdomen whitish; subgenital plate with rounded posterior margin, feebly darkened. Cerci whitish; process of the paraprocts weakly dilated in the middle, white, with apex feebly darkened.

Anterior legs whitish; femora rather thick, covered with scarce small spines, their internal inferior margin with a row of about half a score strong bristles, of which two or three are longer than the others; apex dilated in a small rounded lobe; external inferior margin straight, not at all dilated at apex and without bristles. Anterior tibiae short and wide, armed at apex with four spurs which are curved outwards; internal face with a deep furrow in which the tarsus is located when bent backwards; external face covered with scarce small spines; tarsi formed of two segments. Median femora compressed, rather



FIGS. 2–6.—*Tridactylus pallidus* Chopard sp. n. (2) Antenna; (3) second abdominal tergite of male with depression (glandular pit ?) and tubercle; (4) apex of abdomen of male; (5) anterior leg; (6) median tarsus.

strongly widening in the apical half, adorned with two very light brown bands; tibiae very wide, dilated, conspicuous opaque white with almost transparent margins, adorned with two triangular brown spots at base of the superior margin and a little posterior to the middle of the inferior one; another very feeble median spot; tarsi composed of three segments, the first two very short with a large pulvillus beneath. Posterior femora wide, compressed, adorned on the external face with three very light brown spots; tibiae bearing four external and three internal lamellae; metatarsus a little longer than the supero-apical spurs; lamellae, spurs and metatarsus white.

Elytra very short, adjacent at base only, abruptly narrowing towards the apical quarter, with the trace of a single vein.

Female.—Quite similar to the male; pronotum a little shorter; abdomen without glandular pit at base; paraprocts without small brown upturned plate.

Length of body, ♂ 4·5 mm., ♀ 5 mm.; pronotum, ♂ 1·6 mm., ♀ 1·4 mm.; posterior femur, ♂ 2·7 mm., ♀ 3·1 mm.; posterior tibia, ♂ 2·2 mm., ♀ 2·5 mm.

This remarkable species is very different from all other species of *Tridactylus*, not only because of its pale coloration, but by the antennae comprising nine segments instead of ten, and the abdomen of the male being provided with what is probably a glandular pit at its base.

Specimens examined :—Holotype ♂ and allotype ♀, ♀ paratype, South Africa : Kleinemonde, near Port Alfred, Cape Province, 19.x.1952 (*E. McC. Callan*) ; 2 ♂♀ paratypes, Kasouga, near Port Alfred, Cape Province, 2.xii.1951 (*E. McC. Callan*).

The holotype and allotype will be deposited in the British Museum (Natural History) and paratypes in the Muséum national d'Histoire naturelle, Paris, in the U.S. National Museum, Washington, D.C., and in the National Insect Collection, Pretoria. Further material from Port Alfred, 13.iii.1955 (*E. McC. Callan*) will be deposited at the same time in the above Museums.

Book Notice.

Insect, Fungus and Weed Control. By E. R. de Ong. 8vo. London (Thames & Hudson) ; New York (Chemical Publishing Co., Inc.), 1953. Pp. 400. 10 tabs., 37 text-figs. Price 52*s.* 6*d.*

During the past ten years very considerable advances in the application of chemicals to the control of insects, weeds and fungi have been made. This volume makes available within its covers much information, and summaries of the recent developments, previously spread through many technical journals.

Chapters deal with the physical properties of sprays and dusts, equipment for application, inorganic and organic insecticides and fungicides, mineral, vegetable and animal oils, fumigants, plant derivatives, seed disinfectants and protecting agents, herbicides, forest insects and diseases, livestock insects and arachnida, the control of household insecticides and rodents, and industrial insecticides and fungicides.

The volume should be of interest to agriculturists, veterinary officers, entomologists, public health authorities and foresters although largely based on American experience.

ON THE INDIAN SPECIES OF *LIMNEBIUS* LEACH (COLEOPTERA: HYDROPHILIDAE).

By J. Balfour-Browne, M.A., F.R.E.S.

Up to the present only four species of *Limnebius* have been recorded from India, viz: *rufipennis* (Régimbart, 1903), *almoranus* Knisch, 1904, *singularis* Knisch, 1924 and *distinctus* Knisch, 1924. Knisch treated both *almoranus* and *singularis* as belonging to *Limnebius* (s. str.) and *distinctus* as *Limnebius* (*Bilimneus*).

The receipt of a small collection made by Dr. Theresa Clay from Rajputana and Assam led to a re-examination of all the material from the Indian subcontinent in the British Museum (Natural History), some 76 specimens. As a result of this re-examination it is found that six species are represented, all belonging to the subgenus *Bilimneus* as re-defined by d'Orchymont (1932, *Arch. Hydrobiol.*, Suppl. Bd. **9**: 658–659). *L. singularis* Knisch is sunk as a synonym of *distinctus* Knisch and three new species are described.

rufipennis Régimbart, 1903, *Ann. Soc. ent. Fr.* **72**: 336 (*Limnebius*). Madras; United Provinces

almoranus Knisch, 1924, *Wien. ent. Zeit.* **41**: 29. (*Limnebius* (st. str)) partim. United Provinces.

distinctus Knisch, 1924, *loc. cit.*: 31 (*Limnebius* (*Bilimneus*)).

singularis Knisch, 1924, *loc. cit.*: 31. (*Limnebius* (s. str)) **syn. nov.** United Provinces.

clayae sp. n. Assam.

championi sp. n. (*almoranus* Knisch partim). United Provinces; Punjab

nigritus sp. n. United Provinces.

That five of the six species now known from the subcontinent occur in the United Provinces is rather an indication of the small amount of specialised collecting that has been done than that the United Provinces are really the focal point of distribution. The usual habitat of species of the subgenus is in the grit or fine gravels at the sides of large and small streams. If this grit is stirred the specimens will float to the surface and may be picked off with a fine camel-hair paint brush. By this method it is possible, where the insects occur, to obtain long series in a short space of time. "Orthodox" collecting with a net will rarely produce more than the odd specimen now and again.

The larvae of the genus are, within my experience, exclusively terrestrial, being found on the damp soil among fringing vegetation on the banks of the rivers.

There is very little doubt that appropriate collecting methods in the area would multiply the number of species many times over. Thirteen species are known from the Sunda Islands (d'Orchymont, *loc. cit.*) and very many species are known to me from Africa; from both these countries also, all the species belong to the subgenus *Bilimneus*.

Verbal descriptions, though of little practical use in identifying the species, are appended for most of the species. Dissection and examination of the genitalia

is essential for recognition of the species. Dissection is best performed by detaching the abdomen and extracting the aedeagus through the tergites.

Measurements are made from the anterior edge of the head to the apex of the elytra.

Limnebius (Bilimneus) almoranus Knisch.

Limnebius (s. str) *almoranus* Knisch, 1924, *Wien. ent. Zeit.* **41** : 29 (*partim*, Ranikhet *non* C. Almora).
Limnebius (*Bilimneus*) *almoranus* d'Orchymont, 1945, *Bull. Mus. Hist. nat. Belg.* **21** (6) : 18 (footnote 18).

The original description mentions 16 specimens from " Kumaon, Ranikhet " and two specimens, probably a pair, from " Central Almora ". The collections in the British Museum (Natural History) contain 6 specimens of the former series and both the latter. There are, in addition, 24 specimens labelled " Hardwar, R. Ganges, India, 2000 ft., H. G. C. [hampion] ", one of which bears Knisch's label " Knisch det., 1925, Limnebius almoranus m.". There are also 4 specimens labelled " Tankpur, Kumaon, U.P., India, H. G. C." one of which bears Knisch's label " Knisch det., 1925, almoranus m." and 1 specimen labelled " Haldwani Dist., Kumaon, India, H. G. C." with a printed label " Limnebius almoranus Knisch ".

No type specimen was selected by the describer, either in print or by attachment of a label ; the series from Ranikhet and the two from Central Almora are, therefore, syntypes. I have selected, and labelled, as lectotype the male specimen of a pair mounted together on one pin from Ranikhet. This measures 1·050 × 0·550 mm.

The two specimens from Central Almora prove, as surmised by Knisch, to be a pair. The male has been dissected and proves to be a species distinct from *almoranus* which I describe below under the name *championi* sp. n.

The four specimens from Tankpur, 1 ♂ and 3 ♀, are true *almoranus*. The specimen from Haldwani is a female and cannot be certainly identified in the absence of males taken at the same time. I believe it to be correctly determined.

The series from Hardwar are a species distinct from *almoranus* and the aedeagus agrees with that of the lectotype of *rufipennis* (Régimbart) to which species they have been referred.

L. almoranus appears, therefore, to be a species restricted to Kumaon. The aedeagus (fig. 1*b*) is of very distinct form.

Limnebius (Bilimneus) distinctus Knisch.

Limnebius (*Bolimnius*) *distinctus* Knisch, 1924, *Wien. ent. Zeit.* **41** : 31.
Limnebius (s. str.) *singularis* Knisch, *l.c.*, **syn. nov.**

The original description of *singularis* was prepared from a single specimen of undetermined sex. This specimen is in the British Museum (Nat. Hist.) and has proved to be a female. The species was treated as a *Limnebius* s. str. by Knisch, as may be assumed from the description of the following species (*distinctus*), in the belief that the sutural edge of the elytra was not margined although, in fact, this margin is clearly visible.

The description of *distinctus* was based on three specimens, believed to be females—" drei weibliche exemplare ". These are also in the British Museum

(Nat. Hist.) and re-examination has proved one of them separately mounted, to be a male. This has been dissected. No holotype was selected by the author and accordingly I have selected the male specimen as lectotype. This measures 1·220 × 0·650 mm. Five further specimens labelled " W. Almora, Kumaon U.P., India, H.G.C." have been found in the Museum. These bear a printed determination label " Limnebius distinctus Knisch." A comparison of the paratype females of *distinctus* with the holotype female of *singularis* leaves no doubt that the two names apply to one and the same species.

In view of the synonymy and, further, in view of the fact that the lectotype of *distinctus* is a male I have deliberately selected that name as the valid name of the species although the name *singularis* was printed first. This selection is permissible as a result of the reversal by the Copenhagen Congress, 1950, of the decision of the Paris Congress.

Additional material of this species has been found in the H. G. Champion collection from Punjab : Dhelu, Mandi, 4500 ft., and one male is also before me from the upper Gumti Valley.

The aedeagus (fig. 1*c*) is very distinctive from that of the other described oriental species.

Limnebius (Bilimneus) rufipennis (Régimbart).

Limnebius rufipennis Regimbart, 1903, *Ann. Soc. ent. Fr.* **72** : 336.

This species was based upon two specimens from Madras—Pondicherry and Genji. Through the kindness of M. A. Descarpentries, of the Paris Museum, I have been able to examine both these specimens. The specimen from Pondicherry is a male—aedeagus extracted—labelled " Coromandel, M. Maindron "; "Pondicherry, Juin 1901 "; " Museum Paris, Pondichéry, M. Maindron "; " Type "; "Limnobius rufipennis Rég. typ., det. Dr. M. Régimbart ". The specimen from Genji is also a male—aedeagus extracted—and is labelled " Coromandel, M. Maindron "; "Genji, 25 Août—15 Sept. 1901 "; " rufipennis Rég.".

Both specimens represent the same species. No specimen was definitely selected as holotype, but the specimen from Pondicherry bearing a type label may be accepted as a Lectotype, and I have attached a label accordingly.

The following description may be useful for comparative purposes, but the aedeagus (fig. 1*a*) is distinct from the remaining Indian species and indicates a relationship with the European *myrmidon* Rey.

Head black, with a small rdddish-testaceous patch on either side of the clypeus ; excessively finely punctulate, interstices entirely shining. *Pronotum* brownish-testaceous, the anterior half of the disc more or less fuscous ; extremely finely and quite sparingly punctulate, strongly shining except narrowly at the side where there is a more or less obsolete reticulation. *Elytra* pale brownish-testaceous, dull, finely but distinctly sub-transversely reticulate, not visibly punctate ; sutural edge without trace of a raised margin, even at the apex ; about as long as their combined width at base, weakly attenuate, the sides nearly straight, external apical angle quite effaced, widely rounded, sutural angle rounded rectangular. *Venter* black. *Legs* testaceous. *Length* 0.925 mm. (fig. 1*a*).

This species very closely resembles *almoranus* Knisch, being of approximately the same size and form, but the sutural apical angle of the elytra is more rounded and the external apical angles more sharply though widely rounded. The females are even more closely similar than the males.

As mentioned above, the series of 25 specimens from Hardwar; River Ganges, 2000 ft., (*H. G. Champion*) determined by Knisch as *almoranus* actually belong to *rufipennis*. In addition a series of 9 ♂, 7 ♀ from RAJPUTANA: Bharatpur, 4.i.1952, (*T. Clay*), "from water-weeds on mud and water" also belong here.

Two specimens, both females, one labelled "Sarda Bengal", the other "R. Sarda Gorge, Kumaon, U.P., Dec. 1919, H. G. C.", the former in addition bearing the determination label "*Limnebius* s. str. *rufipennis* Rég. Knisch det. 1922" may possibly belong here. "Bengal" on the first label would appear to be an error.

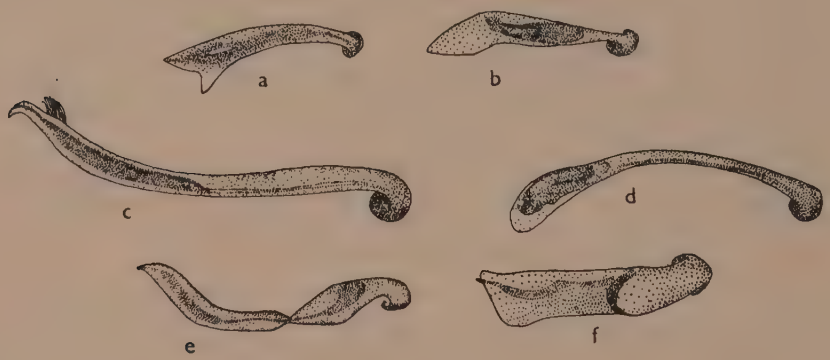


FIG. 1.—Aedeagus of: (*a*) *Limnebius* (*Bilimneus*) *rufipennis* (Régimbart); (*b*) *L.* (*B.*) *almoranus* Knisch; (*c*) *L.* (*B.*) *distinctus* Knisch; (*d*) *L.* (*B.*) *championi* sp. n.; (*e*) *L.* (*B.*) *clayae* sp. n.; (*f*) *L.* (*B.*) *nigritus* sp. n. (All × 100.)

Limnebius (Bilimneus) championi sp. n.

Limnebius (s. str.) *almoranus* Knisch, 1924, *Wien. ent. Ztg.* **41**: 29, partim. (C. Almora *non* Ranikhet).

Head pitchy-brown, the sides of the clypeus in front of the eyes reddish-testaceous; very sparingly and extremely finely punctulate, the interstices entirely shining. *Pronotum* light pitchy-brown, obscurely darker anteriorly on the disc, highly shining except in the posterior angles where there is a fine and rather obsolete reticulation, extremely finely and sparingly punctulate. *Elytra* about as long as their combined basal width, pitchy-brown, finely but sub-obsoletely transversely reticulate, virtually impunctate; the sutural apical angles rounded rectangular, the external apical angles effaced, very widely rounded; suture without trace of margin even at the apex. *Venter* black. *Legs* testaceous. *Aedeagus* (fig. 1*d*).

Holotype, ♂, INDIA: Central Almora, Kumaon (*H. G. Champion*) 1·150 × 0·550 mm.

Paratype: 1 ♀, same particulars as holotype, (*Limnebius* s. str. *almoranus* Knisch det. 1922).

This further species even more closely resembles *almoranus* Knisch than does the preceding. The similarity of form and sculpture is extreme, but the pronotal reticulation is restricted to the hind angles, whereas in *almoranus* and *rufipennis* Rég. it extends over the whole length of the side of the pronotum. The aedeagus is quite distinct from that of the two compared species, suggesting to some slight extent that of *oblongus* Rey.

Limnebius (Bilimneus) clayae sp. n.

Head black, a very small obscure reddish spot on either side of the clypeus in front of the eyes ; very sparingly, extremely finely punctulate, entirely shining. *Pronotum* brunneo-testaceous, largely infuscate in the anterior half, extremely finely and quite sparingly punctulate with some larger punctures near the anterior edge towards the sides, strongly shining, entirely without reticulation even at the sides or in the posterior angles. *Elytra* short, as long as their combined basal width, rufo-brunneous, distinctly and transversely reticulate, virtually impunctate, the sutural edges in the distal half with a very fine margin ; the sides rather distinctly rounded, greatest width behind the base ; apex truncate, the sutural apical angle sharply rounded rectangular, external apical angles widely rounded rectangular. *Venter* black. *Legs* testaceous. *Aedeagus* (fig. 1*e*).

Holotype, ♂, India : Manipur State, Imphal, 13.i.1952, " from mud and roots, edge of pond ", (*Dr. T. Clay*) 1·000 × 0·625 mm.

Paratypes : 2 ♀, same particulars as holotype. 3 ♂, Assam : Kohima, Naga Hills, 4800 ft., 28.i.1952, " from earth, dead leaves, rotten wood. Evergreen forest " (*Dr. T. Clay*).

This little species does not appear to be very closely related to any of the Indian species, nor to those described from the neighbouring lands. The rather broad short form with relatively high convexity make the species readily recognisable. It should be noted that the narrow " neck " in the middle of the aedeagus represents a complete twist ; this occurs in both specimens available and is a natural occurrence, not damage during extraction.

Limnebius (Bilimneus) nigritus sp. n.

Black, sides of head in front of eyes, sides of pronotum and apex of elytra piceo-rufous ; legs and maxillary palpi rufo-testaceous. *Head :* clypeus very finely and subobsoletely reticulate on disc, more distinctly so towards sides, very finely and quite sparingly punctulate; frons reticulate as on clypeus, more copiously and much more distinctly and strongly punctate. *Pronotum* quite transverse, about twice as wide as long in the middle, the cephalic emargination very shallow ; disc quite copiously punctate, the punctures as strong and numerous as those of frons ; interstices on disc quite shining ; sides more finely punctulate, finely but quite distinctly reticulate up to about a longitudinal line drawn through the eye. *Elytra* slightly longer than wide (35 : 28), sutural apical angle rounded-rectangular, external apical angle obsolete ; sides distinctly margined in basal three-fifths, progressively less distinctly so in apical two-fifths ; punctate as on pronotum ; distinctly but finely reticulate, the meshes irregular polygonal but tending to be transverse. *Venter* black. *Legs* rufo-testaceous. *Aedeagus* (fig. 1*f*).

Holotype ♂, India : United Provinces, West Almora, Upper Gumti Valley, iv.1919, (*H. G. Champion*) 1·375 × 0·700 mm.

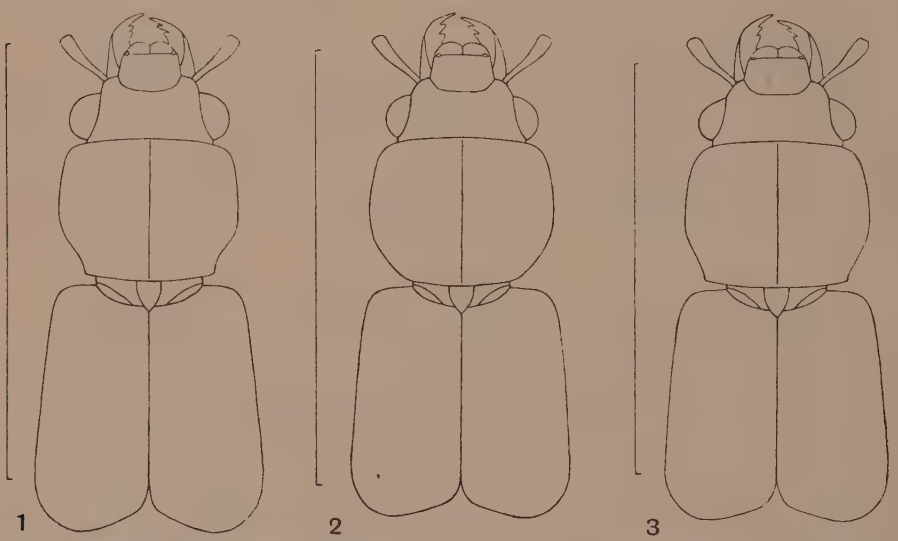
Paratype, 1 ♂, India : Punjab, Sutlej River, Luri, 2000 (? feet) (*H. G. Champion*).

This species is easily distinguished from the foregoing species by its rather larger size and wholly black or piceous colour ; the distinct punctuation of the whole dorsum also effectively distinguishes it. The form of the aedeagus is also very distinct from that of all previously described species.

ON *BLEDIUS DENTICOLLIS* FAUVEL AND *B. OPACUS* (BLOCK) (COLEOPTERA : STAPHYLINIDAE).

By W. O. Steel, F.R.E.S.

Examination of numerous specimens has shown that two distinct species have regularly been confused as *Bledius denticollis* Fauvel, which was a new name for *B. obscurus* Mulsant and Rey nec Motschulsky. The series of the insect from Fauvel's collection was therefore studied in an endeavour to fix the identity of the species.



Figs. 1–3.—Head, pronotum and elytra of: (1) *Bledius denticollis* Fauvel; (2) *B. opacus* (Block), typical form; (3) *B. opacus* var. *subsinuatus* Mulsant and Rey. The scale in each case = 2 mm.

This material consists of two species. It includes one specimen labelled, in Fauvel's handwriting, "*obscurus* Rey type" which can be taken as representative of Mulsant and Rey's species and thus of *denticollis*. It is conspecific with *B. bavaricus* Koch (described as *rastellus* ssp. *bavaricus*), a paratype of which has been examined.

The other species confused with *B. denticollis* is the form of *B. opacus* Block with well-marked posterior angles of the pronotum. In *B. opacus* these angles vary from almost completely rounded and scarcely marked, with the sides of the pronotum scarcely sinuate in front of them, to scarcely rounded and almost rectangular, with the sides of the pronotum distinctly sinuate. A series of specimens can show a gradual transition from one form to the other. Var. *subsinuatus* Mulsant and Rey was erected for specimens with the

sides of the pronotum feebly sinuate and the posterior angles very obtuse and var. *sinuatocollis* Gerhardt for specimens with the pronotal sides distinctly sinuate. In a variable species such as this it is absurd to attempt to name individual variations, so that *subsinuatus*, the earlier name, is here used for the forms with distinct pronotal angles, with *sinuatocollis* as a synonym. Var. *extensus* Motschulsky, which was characterised by the more rounded pronotum, is not considered worthy of separation. Var. *krogeri* Scheerpeltz (= *minor* Krogerus) is not further dealt with here as it appears to be a species other than *opacus*. The synonymy of the species is as follows:

Bledius opacus (Block, 1799):

= *divisus* (Marsham, 1802);
= *castaneipennis* Mannerheim, 1830;
= *haemopterus* Stephens, 1832;
= *extensus* Motschulsky, 1860;

var. *subsinuatus* Mulsant and Rey, 1879;
= *sinuatocollis* Gerhardt, 1899;
= *denticollis* auctt. nec Fauvel, 1870.

The hind angles of the pronotum also show some variation in *B. denticollis* and var. *obtusicollis* (of *bavaricus*) was erected by Koch for specimens with the sides of the pronotum not sinuate behind and the posterior angles obtuse. Judging from the numerous examples examined, the variation in this species is much less than in *B. opacus* and the var. *obtusicollis* is not considered worth retaining. The synonymy, therefore, is:

Bledius denticollis Fauvel, 1870:

= *obscurus* Mulsant and Rey, 1870 nec Motschulsky, 1860;
= *bavaricus* Koch, 1938;
= *obtusicollis* Koch, 1938.

In spite of their confusion under the one name, *denticollis* and *opacus* var. *subsinuatus* are not difficult to separate. The main points of difference are given in the following table:

denticollis	*opacus* var. *subsinuatus*
Head, pronotum and abdomen black, elytra varying from dark brown, which gradually becomes lighter towards the sides (and less so towards the apex) so that the reflexed portion is light yellowish-brown, to black with the reflexed portion obscurely lighter.	Head, pronotum and abdomen black, elytra reddish-yellow, normally with the sutural area broadly or narrowly blackish, the black area sometimes extends to cover the greater part of the elytra but the difference in colour is usually sharp.
Eyes more prominent (fig. 1).	Eyes less prominent (fig. 3).
Elytra closely punctured, the punctures separated, on the average, by rather less than their diameter; longer and broader in relation to the pronotum (fig. 1).	Elytra rather less closely punctured, the punctures separated, on the average, by a little more than their diameter; shorter and less broad in relation to the pronotum (fig. 3).
Pronotum more narrowed behind (fig. 1).	Pronotum less narrowed behind (fig. 3).

In addition to the characters mentioned above, the male of *denticollis* has the clypeal tubercles much more marked than in *opacus*.

Owing to the confusion which has existed with regard to the identity of the species, the published records of *denticollis* need confirmation. Specimens have been seen from the following localities:

FRANCE : Lyons, the type locality.
GERMANY : Bavaria : Grünwald (Stocklein) and Oberstdorf (Vogt coll.).
ITALY : S. Tyrol : Avelengo, 1200 m. and Castelnovale, 300–400 m., River Talvera (*Fagel*).
Carnia, Tolmezzo, foot of Mt. Amariana, 400 m. and Moggio, River Fella, 400 m. (*Fagel*).
Piedmont (Fauvel coll.).
Abruzzi : Aquila, River Aterno, 600 m. (*Fagel*).
NORWAY : Målselv : Moen, Rundhaug, Framnes and Rostavatn (*Strand*).
U.S.S.R. : Source of River Irkut (*Reitter*).

The Norwegian specimens seen are all of the dark form with the elytra more or less black except for the reflexed sides, those from all the other localities are of the light form. Koch (1938, *Mitt. Münch. ent. Ges.* **28** : 47), in his description of *B. bavaricus*, states that dark specimens occurred rarely amongst his material, all of which was from Wolfratshausen and Grünwald in Bavaria.

In a previous paper (Steel, 1953, *Ent. mon. Mag.* **89** : 64) *B. arcticus* Sahlb. and *B. denticollis* were compared and figured. At that time, only one specimen of *denticollis* was available for study and this has since proved to be *opacus* var. *subsinuatus*.

ACKNOWLEDGMENTS.

Thanks are due to Dr. G. Fagel for the loan of material from the Fauvel collection as well as his own collection and also to Mons. H. Coiffait, Dr. G. A. Lohse, Mr. A. Strand and Dr. H. Vogt for the loan of specimens.

TWO APHIDS FROM THE INDIAN REGION.

By J. P. Doncaster, M.A., F.R.E.S.
(*British Museum* (*Nat. Hist.*))

A species of aphid collected on permanent snow at 20,000 ft. by the Oxford University Expedition to the Himalayas in 1952 is here described as new. The aphids, which were all alate, were present in large numbers on the snow, and must have been carried there by air currents from conifer forests at lower levels.

The original description of *Ceratopemphigus zehntneri* Schouteden, 1905, was based on specimens collected by E. E. Green from an unknown host in Ceylon. A recent collection of this aphid from *Brunfelsia uniflora* in Ceylon establishes one of its host plants and provides an opportunity for a redescription of the species.

Cinara (Lachniella) comata sp. n.

Alate viviparous female (macerated specimen). Body rather large, about 4 mm. long. Head and thorax dark sclerotic, abdomen pale with a single longitudinal row of irregularly shaped brown sclerotic plates lying along the mid-dorsal line, a double row of brown " Muskelplatten " on each side, marginal sclerites on abdominal segments I and II, and brown stigmal sclerites. Siphunculi, cauda, subanal and subgenital plates brown sclerotic. Femora dark with pale bases; tibiae brown with darker apices; tarsi dark. Antennae slender, joints I and II dark, joints IV to VI pale with slightly darker apices.

Head rather broad with pronounced median suture, eyes large and prominent, triommatidia small but distinct. Surface of head densely covered with fine, very long hairs (up to 0·25 mm.). Antennal hairs similar in size and shape to cephalic hairs, 5–6 times diameter of third joint, dense on second and third joints, less so on fourth, fifth and basal half of sixth, absent on base of first (except for a single short acute hair on upper surface) and on apical half of sixth. Sixth joint long and cylindrical, longer than fourth, with two primary and two secondary subapical bristles. Joints III, IV and V each with a single secondary rhinarium near the apex, primary rhinaria large, circular, and (like the secondary rhinaria) with thickened chitinous rims. Rostrum slender, reaching just past the third coxae, of five segments, the fifth very long and thin, about three-quarters the length of the fourth. Fourth segment with four long fine secondary hairs, fifth with 8–10 minute hairs near the apex. Wings hyaline, media of fore wing once branched. Legs densely covered with long fine hairs. First tarsal joints short, with dorsal margin shorter than basal diameter; second tarsal joints long, slender, cylindrical, slightly curved. Abdomen with long fine hairs, rather sparse on the dorsum, but dense along lateral margins and on the venter. Siphunculi on large antero-posteriorly elongated cones, bearing 4–5 whorls of long hairs. Cauda broad, helmet-shaped, tapering to a blunt apex.

Measurements of alate viviparous females (*in millimetres*).

	Body length.	Antenna.	Antennal segments. III.	IV.	V.	VI.	Siphunculus (diameter).	Cauda (length).	Rostrum IV + V.	Hind tarsus II.
1.	4·11	1·43	·44	·22	·25	·25	·11	·20	·32	·44
2.	4·32	1·52	·51	·22	·28	·25	·12	·21	·35	·48
3.	3·84	1·47	·51	·23	·26	·24	·11	·18	·33	·44
4.	3·96	1·48	·48	·22	·28	·28	·10	·19	·35	.

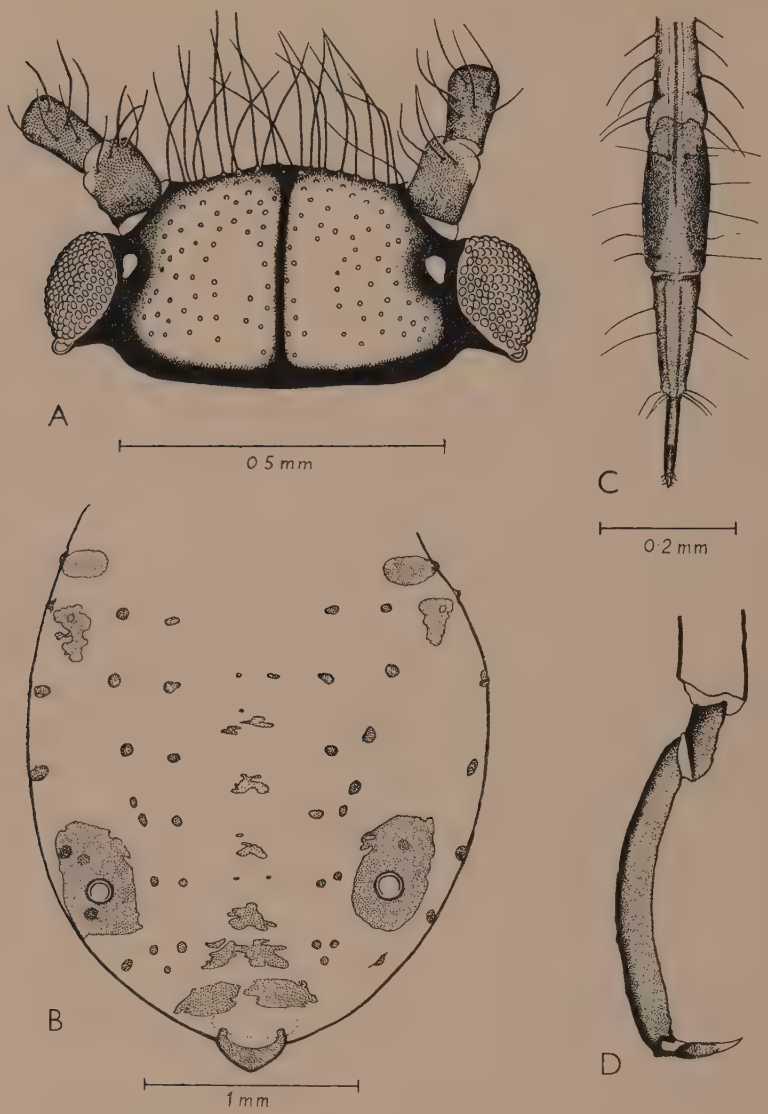


Fig. 1.—*Cinara* (*Lachniella*) *comata* sp. n. A. Head, showing frontal hairs. (Only hairs visible in profile are shown, with bases of the remainder.) B. Abdomen, showing sclerites. (Hairs omitted.) C. Apex of rostrum. D. Hind tarsus. (Hairs omitted.) (*Note :* C *and* D *to same scale.*)

Systematic position.—The once-branched media of the fore wing, the long apical rostral joint, short first tarsal joint with dorsal margin less than basal diameter, presence of two subapical bristles on antennal joint VI, and long fine hairs on body and appendages, bring this species into the genus *Lachniella* Del Guercio, in the sense of Börner (1952) and Pašek (1953). The present writer, however, prefers to regard *Lachniella* as a subgenus of *Cinara* Curtis.

The type of *Lachniella* is *costata* (Zetterstedt). *Cinara* (*Lachniella*) *comata* differs from it in the following characters :

	C. (*L.*) *costata.*	*C.* (*L.*) *comata.*
Wings	Clouded in radial cell and at apex of Cu_2	Hyaline.
Hairs on antennal joint III .	3–4 times joint diameter	5–6 times joint diameter.
Hairs on abdominal dorsum	Very numerous	Sparse.
Hairs on hind tibia . .	Up to 0·2 mm.	Up to 0·35 mm.
Rostral joint V . . .	About half length of IV	About three-quarters length of IV.
Spinal sclerites . . .	Absent	Present.
Cauda	Rounded	Helmet-shaped.

India : United Provinces, Tehri-Garhwal, Mt. Gangotri III, ix.1952 ; four alate viviparous females taken on permanent snow at 18,000–22,000 ft. (*H. F. Lamprey*, Oxford University Expedition to the Tehri-Garhwal (Himalayas) 1952).

Holotype and three paratypes in British Museum (Natural History), London.

Ceratopemphigus Schouteden, 1905.

Frons narrow, bearing a pair of protuberances, prominent, conical or finger-shaped in the last stage nymph, less prominent or greatly reduced in the adult alata, absent in first stage larva. Antennae of six joints in alata and last stage nymph ; joints III–VI in alata bearing narrow transverse fringed secondary rhinaria, joint III with or without a small denticle on the anterior margin near the base. Primary rhinaria with pronounced fringe. Ocelli large ; compound eyes large but not prominent. Wax glands present on head (except in adult) and on thoracic and abdominal segments. Rostrum slender, not reaching middle coxae. Fore wings with media simple, hind wings with two oblique veins arising at or near the same point. Siphunculi absent. Legs slender, first tarsal joints of adult with two hairs. Empodial hairs of first stage larva curved, longer than claws. Trochanters fused to femora.

The genus, which is of masculine gender, has as its type :

Ceratopemphigus zehntneri Schouteden, 1905.

Alate viviparous female (macerated specimen).—Head and thorax dark sclerotic ; abdomen uniformly pale, membranous ; antennae and legs uniformly dark sclerotic ; wing veins brown, the wing membrane very faintly clouded along the borders of the veins ; cauda, subgenital plate and stigmal sclerites brown sclerotic. Wax glands absent from head, paired median wax plates present on meso- and metanotum ; marginal plates present on abdominal segments I–VII, paired spinal plates on I–IV, pleural plates on V and VI, and a pair of fused spino-pleural plates on VII. The wax plates usually bear one or more acute hairs. Body rather large, up to about 3 mm. long. Antennae about one-third length of body ; joint III the longest and bearing 8–12 secondary rhinaria which encompass about half the circumference of the joint ; joints IV and V of nearly equal length, with 4–6 and 2–5 rhinaria respectively ; VI with 3–5 rhinaria ; processus terminalis finger-shaped, about one-quarter the length of base of joint. Antennal hairs short ($\pm$ ·015 mm.). Antennal foramina very large, on the ventral surface of the head, which also bears the median ocellus and much of the compound eyes (fig. 4A). Rostrum pale, apical joint more or less triangular, about twice as long as its basal width, with two secondary hairs besides the normal six primaries. Cauda broadly rounded with 3–4 hairs. Abdominal segment VIII with two hairs, about 0·040 mm. long. Abdominal hairs sparse, fine, up to 0·035 mm. Fore wing with stigma short and broad, the latter heavily pigmented along

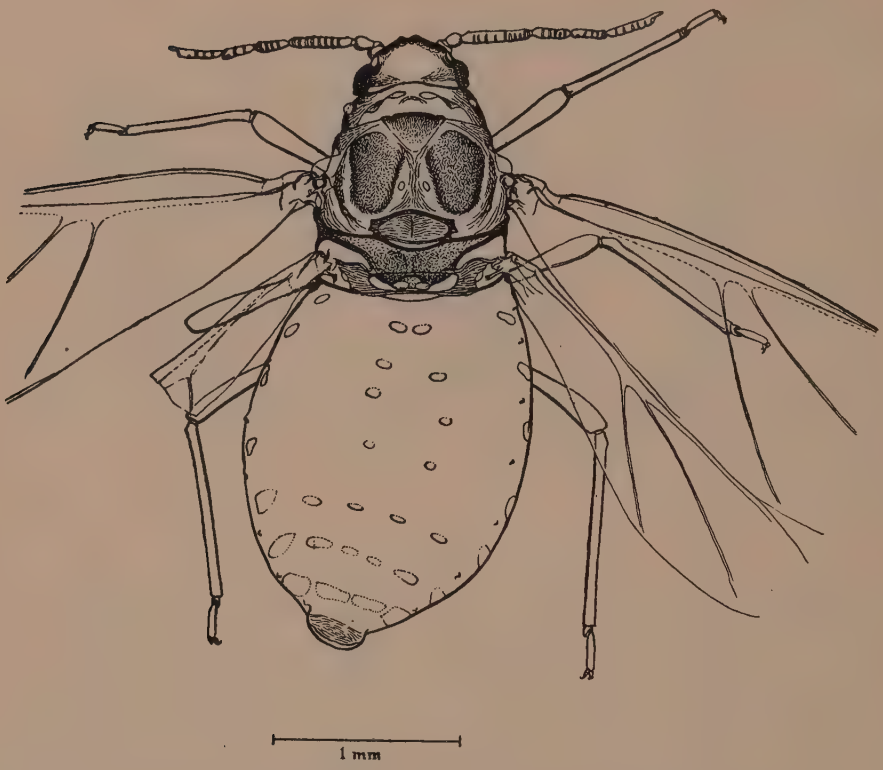


Fig. 2.—*Ceratopemphigus zehntneri* Schout., alate viviparous female (hairs omitted).

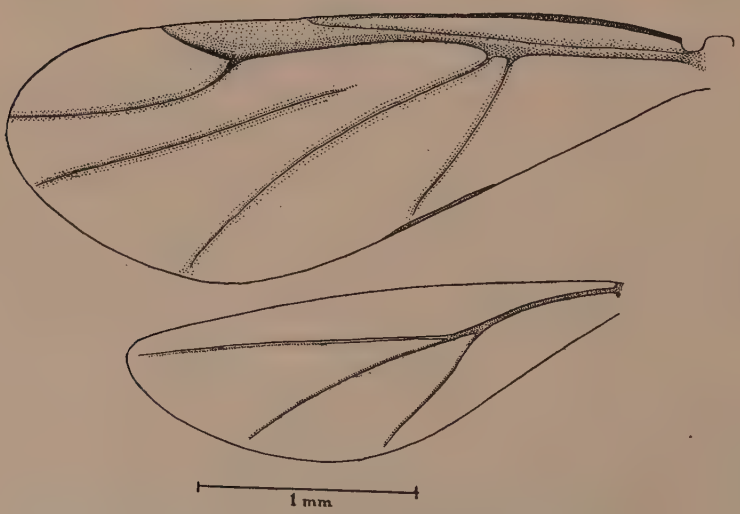


Fig. 3.—*Ceratopemphigus zehntneri* Schout., fore and hind wings.

posterior margin, which bears a row of about 15 very fine hairs. RS slightly curved. M simple, straight, arising some distance from the subcosta. Cu_1 and Cu_2 arising close together, the former curving slightly inwards, the latter nearly straight.

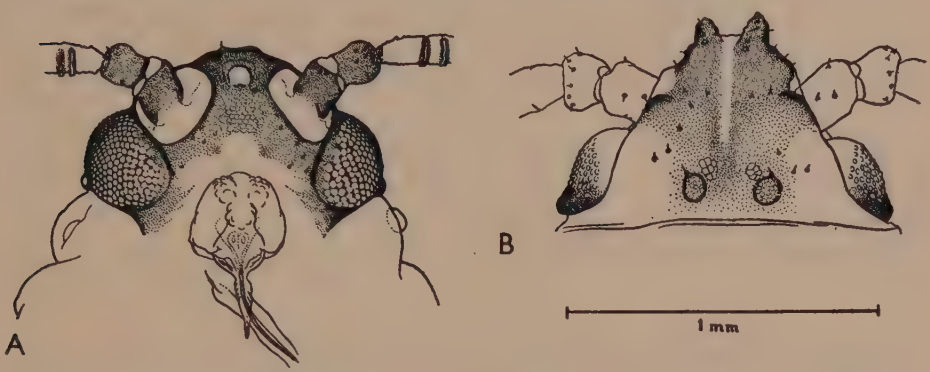


FIG. 4.—*Ceratopemphigus zehntneri* Schout. A. Head of alate viv. fem., ventral surface. B. Head of nymph, dorsal surface.

Nymph (macerated specimen).—Frons, including frontal horns, dark sclerotic with pale median line. Triommatidia and posterior margin of compound eyes dark sclerotic. Antennae, legs and apical rostral joint brown sclerotic, remainder of body colourless. Wax plates as follows: head, one pair of spinal plates on vertex; prothorax, one pair spinals, one pair marginals; mesothorax, one pair spinals; metathorax, one pair spinals, one pair pleurals; abdominal segments; one pair each of spinal, pleural and marginal plates on I to VI, VII with fused spino-pleurals and separate marginals. The abdominal wax plates are large and not easily discernible in cleared specimens.

Measurements of alate viviparous females (in millimetres).

	Body length.	Antenna.	Antennal segments. III.	IV.	V.	VI.	Rhinaria. III.	IV.	V.	VI.	Ult. rostral joint.	Hind tarsus II.
1 .	2·80	1·09	·33	·17	·17	·25	11 10	5 6	3 3	4 4	·11	.
2 .	2·97	1·11	·35	·16	·19	·25	11 .	4 .	5 .	5 .	·13	·21
3 .	2·76	1·05	·32	·17	·17	·24	9 10	5 6	4 4	4 4	·12	·20
4 .	3·00	1·07	·33	·18	·17	·25	12 12	6 5	4 4	4 4	·12	·20
5 .	3·11	1·11	·34	·17	·19	·25	10 11	6 6	4 4	4 4	·13	.
6 .	2·62	1·03	·31	·16	·17	·25	11 9	6 6	3 4	3 3	·12	·20
7 .	?	1·07	·32	·17	·17	·24	11 .	6 .	5 .	4 .	·12	·20
8 .	?	1·15	·34	·18	·18	·26	11 10	6 6	5 .	4 .	·12	·21
9 .	2·83	1·04	·31	·16	·17	·25	8 10	5 6	2 5	4 5	·12	·20

Systematic position.—The genus *Ceratopemphigus* falls within the tribe Pachypappini Börner of the Subfamily Pemphiginae (Lichtst.) Mordvilko of Börner (1952) and shows affinities with the genus *Prociphilus* Koch in having narrow transverse fringed secondary rhinaria and a small denticle near the base of the third antennal joint in the alata. It is distinguished from other related genera by the horn-like frontal processes, which are particularly well developed in the nymph.

Ceylon: Norwood, 9 alate viviparous females, 10 nymphs, 4 larvae from *Brunfelsia uniflora*; date of collection unknown.

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Paratypes in the British Museum (Natural History), London.

Acknowledgments.

Grateful acknowledgment is due to Dr. H. Schouteden for his generous gift of paratypes of *Ceratopemphigus zehntneri*. The writer is also indebted to Mr. D. Hille Ris Lambers and the late Dr. V. Pašek for their advice on the systematic position of *Cinara* (*Lachniella*) *comata*.

References.

Börner, C., 1952, Europae Centralis Aphides. *Mitt. thüring. bot. Ges.*, Beiheft 3.
Pašek, V., 1953, *Mém. Soc. zool. tchéchosl.* **17** : 3.
Schouteden, H., 1905, *Spolia Zeylan.* **2** : 187.

NOTES ON PASSALID COLEOPTERA FROM NEW GUINEA WITH THE DESCRIPTIONS OF TWO NEW SPECIES.

By W. D. Hincks, D.Sc., F.R.E.S.
(*Manchester Museum*)

A small collection of Papuan Passalid beetles made by Dr. J. J. H. Szent-Ivany in moss forest at 8000–9,400 ft., kindly sent for identification by Dr. W. J. Hall of the Commonwealth Institute of Entomology, is reported on in the present paper. Five species are represented, two of which appear to be undescribed. The types of the latter will be deposited in the British Museum (Natural History), the paratypes and the remaining specimens being returned to the Department of Agriculture, Port Moresby.

Subfamily Macrolininae.

Mastochilus Kaup.

Mastochilus Kaup, 1868, *in* Harold, *Coleopt. Hefte* **3** : 19 (*Mastachilus*) (type : *Passalus polyphyllus* MacLeay). Hincks and Dibb, 1935, *in* Junk, *Col. Cat.* **142** : 87.

Hitherto only two species of this otherwise Australian genus have been described from New Guinea : *Episphenoides pectiniger* Heller, 1910 (*Abh. zool-anthropi-ethn. Mus. Dresden* **13** (3) : 17, f. A) and *Mastochilus subobliquus* Tryon. The latter was described in a very inaccessible publication so that it may be useful to reproduce the description here. There is only the original author's authority for its inclusion in *Mastochilus* and it may actually prove to belong to *Labienus* Kaup.

Mastochilus subobliquus Tryon.

Mastochilus subobliquus Tryon, 1890[1], *Ann. Rep. Brit. New Guinea 1st July*, 1889 *to 30th June*, 1890. *Appendix* V : 110.

" Frontal ridge well defined ; two stout teeth project from the clypeus on to the labrum, one of which is larger than the other. These teeth are connected at the bases by a low transverse ridge, but no oblique ridge connects them with the prefrontal ridge ; the central portion of the labium is separated from the lateral by deep grooves and is rather narrow. Prothorax very tumid, with mesial impression almost obsolete ; the depression opposite the posterior lateral angle is large, and filled with punctures, and there is generally a shallow depression adjacent to the hind margin, halfway between the lateral angle and the centre. Striae of elytra very pronounced and all crenated. Length 40 mm.

Note[2]:—The only *Mastochilus* recorded from New Guinea is *M. obliquus* Kirsch, and this is described in an inaccessible Dresden publication. It does not appear that the specific appellation *obliquus* is in any way applicable to the insect under examination."

Mastochilus papuanus sp. n.

Shining black ; pubescence golden brown. *Head* symmetrical ; outer tubercles triangular, widely separated ; inner tubercles large, separated by only two-thirds the distance separating outer tubercles, joined by a strongly marked concave ridge ; frontal ridges slender but reaching outer tubercles ; central tubercle decumbent, not free at apex ; depressed areas of head very feebly and obscurely punctured. Antennae with three proximal lamellae of club relatively short, first being hardly as long as the proximal portion of the segment ; three distal lamellae long. *Pronotum* transverse, impunctate except for one or two isolated

[1] Hincks and Dibb (1935 : 89) give the date as 1892 following Gravely (1918 : 129), where the full title is quoted as " Coleoptera collected by Mr. A. C. English in the St. Joseph river district of British New Guinea, under the auspices of his Honour the Administrator. "

[2] Mr. Tryon's note includes two examples of unconscious entomological humour !

punctures in or near scars ; median groove strong, nearly complete ; anterior marginal grooves weak, almost impunctate ; lateral grooves relatively broad, impunctate ; lower caudal angles with rather scanty, short pubescence. *Elytra* with dorsal striae almost impunctate ; lateral striae finely punctate ; shoulders without hair-tufts. *Mentum* with side-pieces so strongly granulate as to obscure scars ; median portion with a small semicircular groove near anterior margin, cutting off a more or less triangular portion. *Mesosternum* at sides strongly punctured and hairy so that the scars are obscured. *Metasternum* with disc impunctate but shallowly and somewhat rugosely sculptured and having a depression near caudal margin ; sides strongly and extensively punctured (more finely in lateral areas) and hairy so as to obscure boundary between lateral and intermediate areas ; posterior intermediate areas with anastomosing punctures but without hairs. *Abdomen* polished and impunctate except in scars.

Length 34–35 mm.

Type and Paratype, New Guinea : Daulo Pass, E. Highlands, moss forest, 8000 ft., 15.vi.55 (*Dr. J. J. H. Szent-Ivany*).

This species is clearly not *M. subobliquus* Tryon. It is, however, on the basis of Heller's description, similar to *M. pectiniger*. It differs in its smaller size, relatively short proximal segments of the antennal club, and in having the sides of the mesosternum extensively punctured and hairy, instead of bearing linear, finely granulate scars. It is closely allied to the generotype, the Australian *M. polyphyllus* (MacLeay), differing in the closer and stronger inner tubercles, hairy mesosternum and more extensively hairy metasternum.

Cetejus obliquus (Kirsch).

Mastochilus obliquus Kirsch, 1877, *Mitt. zool. Mus. Dresden* **2** : 140 (Ins. Jobi : Ansus).
Cetejus obliquus (Kirsch) Hincks and Dibb, 1935, *in* Junk, *Col. Cat.* **142** : 92. Hincks, 1937, *Nova Guinea* (n.s.) **1** : 115 ; 1938, *Ent. mon. Mag.* **74** : 176.

New Guinea : Daulo Pass, E. Highlands, moss forest, 15.vi.55, 1 ex. (*Dr. J. J. H. Szent-Ivany*).

This example agrees well with the small series in my own collection, several of which were referred to in the papers noted above (1937, 1938) as being probably conspecific with a paratype of Kirsch's species examined in 1936. It must be admitted that there is little except its smaller size to distinguish this species generically from *Mastochilus* and Gravely's (1918) action in regarding *Mastochilus* Kaup, *Pharochilus* Kaup, *Analaches* Kuwert, and *Cetejus* Kaup as mere subgenera is probably justified.

Pseudepisphenus perplexus Gravely.

Pseudepisphenus perplexus Gravely, 1914, *Mem. Indian Mus.* **3** : 327, f. 8A, 8B. Hincks and Dibb, 1935 *in* Junk, *Col. Cat.* **142** : 98. Hincks, 1937, *Nova Guinea* (n.s.) **1** : 121.

As mentioned in 1937, only about half a dozen specimens of this species have been previously recorded. Dr. Szent-Ivany collected three specimens at Daulo Pass on 15.vi.1955.

Subfamily Leptaulacinae.

Leptaulax bicolor (Fabricius).

Passalus bicolor Fabricius, 1801, *Syst. Eleuth.* **2** : 256.
Leptaulax bicolor (Fabricius) Hincks and Dibb, 1935, *Col. Cat.* **142** : 100.

New Guinea : Daulo Pass, E. Highlands, moss forest, 8000 ft., 15.vi.55, 5 ex.; Asaro-Chimbu Divid. Range (Koffena), E. Highlands, moss forest 9000–9400 ft. 12.vi.55, 3 ex. (*Dr. J. J. H. Szent-Ivany*).

New Guinea : Edie Creek, 7000 ft., 13 ex. (*Staudinger*) (coll. Hincks).

The series from Daulo Pass and Asaro-Chimbu is extremely puzzling, all eight specimens agree exactly *inter se* and cannot be run down to *L. bicolor*, or indeed to any species, with Gravely's key (1918 : 118) because the pronotum and posterior intermediate areas of the metasternum are devoid of punctures. In addition they have a large patch of hair-bearing punctures covering most of the last visible abdominal sternite and the distal half of the penultimate. Although the abdominal puncturation of *L. bicolor* is extremely variable, as pointed out by Gravely (1918 : 115), no specimens previously examined have a comparable patch of hair-bearing punctures. An examination of undetermined material in my own collection, however, now reveals a series of 13 from Edie Creek which are all identical with Szent-Ivany's specimens. Van Doesburg (1942) examined a series of *L. bicolor* from Formosa, noting that some individuals had a tuft of hairs on the last abdominal sternite. On dissection he found that the individuals with hair-tufts were all females to which he gave the female varietal name of *formosanus*.[3] Dissection of the Daulo and Asaro-Chimbu series, however, shows that both sexes are included and that the present much more extensive patch of hairs is not a sexual character. The male genitalia thus dissected revealed a very striking difference between them and the majority of *L. bicolor* males. The distal declivity of the median lobe in the present form bears a pair of long slender upward and backward directed teeth, whereas in most *L. bicolor* there is no trace and the declivity is perfectly smooth. In two males, however, which otherwise appear to be normal *L. bicolor* there are two conical tubercles on the median lobe in a similar position to the teeth already mentioned. In one further respect the present series differ from typical *L. bicolor* ; the frontal ridges are evanescent beyond the inner tubercles, or, if traceable, they are directed towards the head margin, which they fail to reach, at a point between the inner and outer marginal tubercles.

So far it might be reasonable to suppose that a distinct species is involved but an examination of the large series of *L. bicolor* in my own collection revealed two specimens in some degree intermediate. The first is from Fly River (*L. M. D'Albertis* 1876–7) and is a female agreeing with the present series in all characters except that the sides of the pronotum and the posterior intermediate areas of the metasternum are punctured. The second specimen, also a female, is small (barely 14 mm.), and is from New Britain : Mope, 22.xi.1936 (*P. J. Schneider*). This has frontal ridges of the *L. bicolor* type, a punctured pronotum and metasternum, and hair-bearing punctures only on the last abdominal sternite. It is possible that the present material may represent a montane form as it will be noticed that their altitudes range from 7000 to 9400 ft. Unfortunately, however, no data are available regarding the altitudinal range of typical *L. bicolor*, so that the matter must be left as an unsolved problem for the present.

One further point may be mentioned. Many names proposed by Kuwert (1891, 1898) in the genus *Leptaulax* were correctly sunk as synonyms of *L. bicolor* (F.) and *L. dentatus* (F.), the two dominant species, by Gravely (1914, 1918). The Fly River specimen above mentioned agrees well with *L. obtusidens* Kuwert which Gravely (1914) retained as distinct but in 1918 (p. 115) he regarded the characters of the frontal ridges as " somewhat indefinite " and consequently

[3] Similar individual differences, perhaps sexual, have been noted in *L. sambawae* Gravely (Gravely 1918 : 114 ; Hincks 1952 : 308).

reduced it to a synonym of *L. bicolor*. He made no mention of the hair-bearing tufts on the abdominal sterna. Twenty-seven Kuwertian names have been sunk as synonyms of *L. bicolor* (together with 7 names by Zang) (see Hincks and Dibb, 1935 : 100–102), so that any attempt to apply infra-specific names to this extremely variable species, if such were thought desirable, would require a careful examination of the extensive synonymy.

Leptaulax hirsutus sp. n.

Black ; dorsum of elytra reddish-brown, darker at sutures. *Head* with depressed areas strongly punctured and with long reddish pubescence ; frontal ridges forming an evenly but feebly curved ridge ending abruptly at the inner tubercles, some distance behind the margin of the head and more or less midway between the inner and outer marginal tubercles; the latter acute, prominent ; parietal and supraorbital ridges united. Antennal lamellae long (for the genus), all of more or less equal length. *Pronotum* transverse ; lateral marginal grooves fine, feebly punctured, but obscured by the extensive, rather fine, hair-bearing punctures distributed over the entire sides ; scars punctured. *Elytra* polished throughout ; sides with hardly scalariform punctures ; latter fine on disc ; shoulders with small but distinct tufts of hairs. *Mesosternum* with hair-bearing punctures in front, laterad in the scars, and mesad on either side of a polished discal portion, or throughout except for a median strip. *Metasternum* strongly and extensively punctate and hairy, excluding the raised discal portion. *Abdomen* with a large patch of hair-bearing punctures covering most of the last two visible sternites except the antero-lateral portions of the penultimate.

Length 21 mm.

Type and Paratypes, New Guinea : Daulo Pass, E. Highlands, 8000 ft., moss forest, 15.vi.55 (*Dr. J. J. H. Szent-Ivany*). Koffena, Divid. Range between Asaro-Chimbu Valley, 9700 ft., 13.vi.55 (*Dr. J. J. H. Szent-Ivany*). (Coll. Hincks.)

This species would run to *L. bicolor* (F.) with Gravely's key (1918 : 118) but is clearly distinct in many characters, as for instance the bicoloured elytra[4] (if this is not due to immaturity), the presence of hairs on the sides of the pronotum, mesosternum, sides of metasternum, and the last two visible abdominal sternites. Similar characters will distinguish it from other members of the genus.

References.

Gravely, F. H., 1914, An Account of the Oriental Passalidae (Coleoptera). *Mem. Indian Mus.* **3** : 177–353, pls. xi–xiii.

—— 1918, A Contribution towards the revision of the Passalidae of the World. *loc. cit.* **7** (1) : 1–144, pl. 1.

Hincks, W. D., 1937, Passalidae (Col.) from Papua, collected by Miss L. E. Cheesman. *Nova Guinea* (n.s.) **1** : 112–124.

—— 1938, Passalidae (Coleoptera) from the Cyclops Mountains, Dutch New Guinea. *Ent. mon. Mag.* **74** : 175–177.

—— 1952, Passalidae (Col.) from Sumba, Flores and Timor. *Verh. Naturf. Ges. Basel* **63** : 307–9.

Hincks, W. D. and Dibb, J. R., 1935, *In* Junk, *Coleopterorum Catalogus*. Pars 142, Passalidae, pp. 118. Berlin.

Kuwert, A., 1891, Systematische Uebersicht der Passaliden Arten und Gattungen. *Dtsch. ent. Z.* **1891** : 161–192.

—— 1898, Die Passaliden dichotomisch bearbeitet (2). *Novit. zool.* **5** : 259–349.

Van Doesburg, P. H., 1942, Sexueel verschil bij een *Leptaulax*-species. *Tijdschr. Ent.* **85** : xxxv–xxxvi.

[4] The two other bicoloured species of Passalidae so far known are *Leptaulax glaber* (Kirsch) and *L. pulchellus* (Arrow).

THREE NEW SPECIES OF *HYPTIOGASTER* KIEFFER (HYMENOPTERA : GASTERUPTIIDAE) FROM EASTERN AUSTRALIA.

By R. W. Crosskey, M.Sc., F.R.E.S.

Through the kindness of Mr. E. F. Riek the author has had the opportunity of examining a fine collection of *Hyptiogaster* species from the Division of Entomology Museum, C.S.I.R.O., Canberra. Amongst this material were three new species, which are described in this paper.

Hyptiogaster melanopleura sp. n.

Recognised by the unusual shape of the head behind the eyes (fig. 2) and by the contrasting coloration; body reddish-yellow except for the head and mesopleura which are black.

Male.—Length: 8·5 mm. Colour light reddish-yellow except the head, pro-episterna and mesopleura which are black; lower halves of the metapleura, mid and hind coxae, upper sides of the hind trochanters, and the two terminal segments of the gaster fuscous.

Head short and broad, very much wider than the thorax, and greatly swollen behind the eyes; lines of the head angled between the eye and the vertex when seen from above (fig. 2); in dorsal view distance between the anterior and posterior margins of the eye very much greater than that between the posterior margin and the occipital border of the head; occipital carina narrow, the hind margin of the head not deeply incurved; shining, but very minutely and closely punctured; front of the head with short thick silvery pubescence; epistomal suture indistinct, malar area shorter than the second antennal segment; frontal carina very weakly developed, connected by a faintly impressed line to the anterior ocellus; distance between the posterior ocelli about equal to that between a posterior ocellus and the eye margin. Antennae 13-segmented; third antennal segment equal in length to the first, four times as long as the second, and very nearly as long as the fourth and fifth segments together, fourth to tenth segments distinctly longer than broad but eleventh and twelfth segments quadrate.

Thorax short and deep; pro-episterna with long pubescence beneath, glabrous and microscopically pitted dorsally; pronotum without processes, nearly glabrous and smooth, but minutely carinate in the pronotal depressions; mesonotum shining and a little longer than broad, anterior corners evenly rounded, moderately strongly rugose, the rugosity tending to transverse carination on the prescutum and scutellum; borders of the scutellum finely carinate; parapsidal furrows indistinct; prescutum moderately strongly raised, the bounding furrow shallow; mesopleura distinctly divided into upper and lower sections by longitudinal grooves, the upper sections shining with long sparse hairs, lower sections dull with thick white pubescence; mesepimera concave, the upper halves transversely carinate; upper sections of metapleura glabrous, smooth and shining, lower sections pubescent, finely rugose and dull; propodeum finely rugose with a short median longitudinal carina above the hind coxae. Hind coxae microscopically punctate, very finely transversely striate in the shallow dorsal coxal depressions; hind trochanter simple; hind tibiae with the usual fine microscopic pubescence, and with long sparse erect hairs; hind metatarsus about twice as long as broad, about equal in length to the three succeeding segments together; fifth hind tarsal segment equal in length to the second and third segments together; hind claws small, shorter than the last tarsal segment; each hind tarsal segment except the fifth with short stout spinous hairs, particularly on the undersides near the apex; hind tibial spurs short and stout, equal in size to one another. Wings hyaline, hind wing with three hamuli.

Gaster slender, dorsum of the first segment polished and shining, ends of the tergites with very short fine pubescence in patches.

Material examined.—Holotype, ♂, AUSTRALIA : 50 miles west of Wilcannia, New South Wales, 23.xi.1949 (*E. F. Riek*). Type in the Department of Entomology Museum, C.S.I.R.O., Canberra.

Affinities.—Only the type is known, but the species is quite distinct and rather isolated from other members of the genus, the shape of the head and the striking coloration being very unusual. The form of the head most nearly resembles that in *H. pilosa* Kieffer, but the species differs markedly in coloration, absence of long pubescence on the gaster, in the deep angle between the hind margin of the eye and the head (fig. 2), in having only three hamuli, and in other minor ways including differences in sculpture. The female is unknown.

Hyptiogaster rieki sp. n.

Distinguished by combination of the following characters : frontal carina present, hind trochanter simple, head strongly contracted behind the eyes (fig. 1), hind tarsal segments with large spinous hairs (fig. 3), hind claws of the female nearly as long as the last tarsal segment (fig. 3) ; male with antennae 14-segmented.

Female.—Length : 12–14 mm. Colour dark reddish-fuscous with the upper sides of the middle femora, hind trochanters and pro-episterna darker than the rest of the body ; posterior end of each segment of the gaster with very short fine white pubescence.

Head, including the eyes, about the same width as the thorax at the tegulae, prolonged and gently contracted behind the eyes (fig. 1) ; occipital carina strong, the hind margin of the head deeply incurved as a semicircle ; head dull and very finely shagreened under high power ; vertex with a shallow transverse groove connecting the posterior ocelli ; clypeus almost smooth, epistomal suture distinct ; malar area very short, shorter than the second antennal segment ; frontal carina present. Distance between the posterior ocelli distinctly greater than that between a posterior ocellus and the eye. Third antennal segment four times as long as the second, longer than the first, and twice as long as the fourth ; terminal flagellar segments subquadrate.

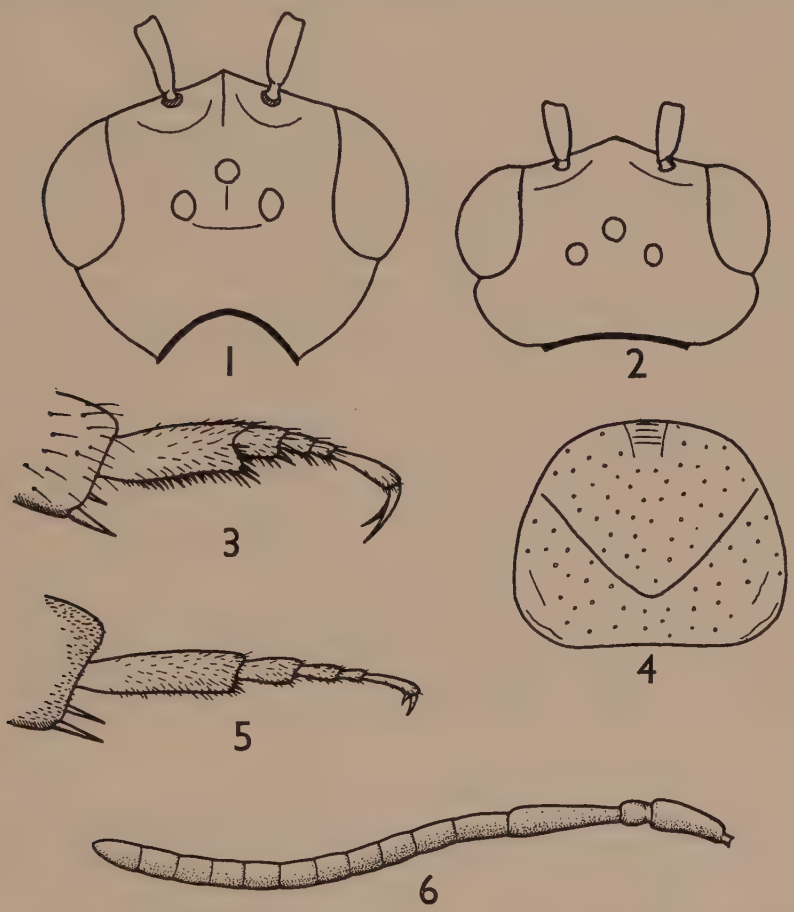
Thorax short and deep ; pronotum without processes, finely shagreened, depressions shallow ; pro-episterna finely shagreened ; mesonotum almost as broad as long, moderately strongly rugose, the anastomosing raised areas smooth and shining and showing no tendency towards transverse wrinkling ; prescutum not strongly raised, the bounding furrow shallow ; so-called notal sutures of the prescutum only very faintly indicated in the sculpture by an absence of puncturation ; parapsidal furrows very indistinct ; scutellum with similar sculpture to the mesonotum, scutellar furrows indistinct ; mesopleura and metapleura shagreened with very short thick silvery pubescence ; propodeum finely rugose, with a short median longitudinal carina above the hind coxae visible only with high power. Middle tibiae with long thick pubescence on the outer sides ; hind coxae almost smooth above ; hind trochanter simple ; hind tibiae in side view under high power with pits from which rise short stout bristly hairs in addition to the very fine recumbent pubescence ; inner apical spur of the hind tibia much longer than the outer ; hind metatarsus about two and a half times as long as broad, longer than the three succeeding segments together ; each hind tarsal segment with a number of stout terminal bristles, these forming a long pecten on the apex of the metatarsus ; hind claws very large and about as long as the last tarsal segment. Wings hyaline, pterostigma yellowish, hind wing with three hamuli.

Gaster with the dorsum of the first segment smooth and shining ; ends of the abdominal tergites with very short fine pubescence and some sparse longer and stouter hairs on the terminal segments. Ovipositor hidden, not extending beyond the apex of the gaster.

Male.—As the female except in the following respects : Occasionally with parts of the head and pro-episterna nearly black ; third antennal segment three and a half times as

long as the second and one and three-quarter times as long as the fourth ; terminal flagellar segments distinctly elongate ; bounding furrow of the prescutum more pronounced ; hind metatarsus about three times as long as broad, about equal in length to the three succeeding segments together ; hind claws small, much shorter than the last tarsal segment ; dorsum of the first segment of the gaster with some minute shallow pits.

Material examined.—Holotype, ♀, AUSTRALIA : Sunnybank, Queensland, 1.xii.1951 (*E. F. Riek*). In the Department of Entomology Museum, C.S.I.R.O., Canberra. Paratypes, 17 ♂ and 15 ♀, data as for type ; 1 ♂, Brook Creek, Burnside, Northern Australia, 2.v.1929 (*T. G. Campbell*).



FIGS. 1–6.—(1) *Hyptiogaster rieki* sp. n., dorsal view of head ; (2) *H. melanopleura* sp. n., dorsal view of head ; (3) *H. rieki* sp. n., ♀, inner lateral view of hind tarsus and apex of tibia showing long tibial hairs, spiny hairs of tarsus, unequal apical tibial spurs, and large claws ; (4) *H. reticulata* sp. n., mesonotum showing small scattered punctures ; (5) *H. australis* (Westwood), ♀, inner lateral view of hind tarsus and apex of tibia showing short fine tibial pubescence, short fine tarsal hairs, equal tibial spurs, and small claws ; (6) *H. rieki* sp. n., 14-segmented antenna of the male.

Affinities.—The male of this new species is almost unique in having a 14-segmented antenna, in contrast to the normal 13 segments. It has long been regarded as a family characteristic of the Gasteruptiidae that the antenna of the male has 13 segments and the female 14 segments; the finding of the present species male (eighteen specimens examined) to have a 14-segmented antenna caused the author to examine all the British Museum (Natural History) material of the family to see whether males of other species showing 14 antennal segments had been overlooked. All species of *Gasteruption* examined had the usual 13 segments, and among the Hyptiogastrinae only the male type of *Hyptiogaster extranea* Turner showed 14 segments. Turner (1918), when describing *H. extranea*, evidently failed to notice that the antennae were 14-segmented, and this curious characteristic was later overlooked by Brues (1922), who obtained further material of male *H. extranea*, as well as by the present author when re-describing the species (Crosskey, 1953). Although *H. rieki* sp. n. and *H. extranea* Turner are both very extraordinary in showing this 14-segmented male antenna they are certainly not closely related within the genus. *H. rieki* is a much larger insect, with a frontal carina, an unmodified mesonotum, and an almost smooth scutellum, and occurs in Australia; *H. extranea* is small (7 mm.), without a frontal carina, with a strongly arched mesonotum showing strong regular parallel transverse carinae, and with a carinate scutellum, and occurs in the Fiji Islands. The affinities of *H. rieki* undoubtedly lie with *H. patellata* (Westwood), and *H. australis* (Westwood); there is a close general resemblance in size, the form of the head behind the eyes, in the presence of a frontal carina combined with the simple hind trochanter, and in general body facies. *H. rieki* differs from *H. patellata* and *H. australis* in the pitted hind tibiae with short bristly hairs, in the stout bristly hairs of the hind tarsi (*cf.* figs. 3 and 5), in the clothing of long thick hairs on the outer sides of the middle tibiae, and in the shallow scutellar furrows. The male may be distinguished by the 14-segmented antenna (fig. 6), and the female by the greatly enlarged hind claws. The hind claws of the females of *H. patellata* and *H. australis* are small, very much shorter than the last tarsal segment. There are other minor differences in sculpture and the proportions of the basal antennal segments. *H. patellata* and *H. australis* are also largely black, whereas *H. rieki* is entirely red except for occasional males, which show dark marks on the head and prothorax.

Hyptiogaster reticulata sp. n.

Recognised by the short deep thorax, the asymmetrical first segment of the hind tarsus, combined with the form of the mesonotum which is almost smooth, shining with small scattered punctures (fig. 4).

Female.—Length: 5 mm. Mainly reddish but darker fuscous on the front and mid legs, the apex of the gaster, vertex and antennae; central mark of the prescutum and each side of the scutum nearly black.

Head shining, almost glabrous but with some sparse hairs on the face between the antennae and the eyes, and on the genae; head very abbreviated and strongly contracted behind the eyes, the occipital carina weak and very gently incurved; head nearly smooth, but under high power seen to be microscopically reticulate with some minute diffused punctures; clypeus glabrous and shining, the epistomal suture very distinct between the clypeus and the inter-antennal area, only faintly marked between the clypeus and the malar area; malar area equal in length to the second antennal segment; frontal carina absent, the frons nearly flat between the antennae; small impressed fovea between the

anterior ocellus and the antennal insertions; distance between the posterior ocelli about equal to that between a posterior ocellus and the eye. Third antennal segment a little shorter than the first, twice as long as the second, one and a half times as long as the fourth; flagellar segments short, a little broader than long.

Thorax short and deep; pronotum without processes, very minutely reticulate under high power with a few dispersed shallow punctures; mesonotum shining, somewhat rounded, a little broader than long, with small scattered punctures (fig. 4), microscopically reticulate; prescutum gently convex, bounding furrow well marked; parapsidal furrows indistinct; scutellum sculptured as the mesonotum; pleura very finely rugose, rectangular upper parts of mesepimera distinctly separated from lower parts by longitudinal furrows; mesepimera not concave; propodeum finely rugose, without a fine median longitudinal carina above the hind coxae. All femora and tibiae with long sparse erect hairs; hind coxae shining, nearly smooth; hind trochanter simple; hind femora somewhat incrassate; hind tarsus with the first segment asymmetrical and a sharp terminal prolongation on the outer side; hind metatarsus four times as long as broad, longer than the three succeeding segments together; hind claws small, shorter than the last tarsal segment. Wings hyaline, hind wing with three hamuli.

Gaster greatly expanded towards the apex, almost glabrous, dorsum of the first segment smooth and shining; ovipositor hidden, not extending beyond the apex of the gaster.

Male.—As the female, except in the following respects: Predominantly black, but clypeus, mandibles, pronotum and mesepimera reddish, legs and sides of the gaster partly fuscous; flagellar segments elongate, almost twice as long as broad; mesonotum smooth between the punctures; prescutum more strongly rounded; propodeal sculpture running into fine carination; hind metatarsus three times as long as broad, about equal in length to the three succeeding segments together; gaster long and slender, with patches of short fine pubescence on the ends of the segments; length 7 mm.

Material examined.—Holotype ♀, AUSTRALIA: Cotter River, Canberra, 6.ii.1947 (*E. F. Riek*). In the Department of Entomology Museum, C.S.I.R.O., Canberra. Paratype, 1 ♂, Canberra, 25.xi.1947 (*E. F. Riek*).

Affinities.—The short deep thorax, the form of the mesonotum, and the asymmetry of the first segment of the hind tarsus place this species near *H. darwini* (Westwood); it differs in having only the first segment of the hind tarsus asymmetrical, in the smooth almost unsculptured mesonotum, in the relatively longer flagellar segments, in the shining clypeus, and in minor differences of head sculpture and vestiture of the femora and tibiae. The species seems to represent a first stage in the development of tarsal asymmetry; only the hind metatarsus is affected, and shows an outer apical prolongation, the remaining hind tarsal segments being normal. In *H. darwini* asymmetry has gone one stage further, and affects the first two segments, i.e. the metatarsus and the following segment. In *H. spinitarsis* (Westwood) (*see below*) tarsal asymmetry affects three or four segments, although there is some variation in the degree of asymmetry, and males are sometimes less asymmetrical than females.

Synonymy of *Hyptiogaster spinitarsis* (Westwood).

The type of *Foenus spinitarsis* Westwood from the Oxford University Museum was recently examined and proved to be a *Hyptiogaster* (having two closed discoidal cells in the fore wing with the cubitus springing from the basal vein, and an undivided hind trochanter). The specimen appeared to be very similar to *H. brevithorax* (Kieffer), and was compared with Kieffer's type of *brevithorax*. Comparison of Westwood's male type of *spinitarsis* with Kieffer's

female type of *brevithorax* left no doubt that, although of different sexes, the specimens belong to the same species. Full synonymy is given below :

Hyptiogaster spinitarsis (Westwood, 1851) **comb. nov.**

Foenus spinitarsis Westwood, 1851, *Trans. ent. Soc. Lond.* (2) **1** : 221, ♂.
Gasteruption spinitarse (Westwood), Schletterer, 1885, *Verh. zool.-bot. Ges. Wien* **35** : 313, 323, ♂ ; Schletterer, 1889, *Ann. naturh. (Mus.) Hofmus. Wien* **4** : 432, ♂ ; Kieffer, 1912, Evaniidae in *Das Tierreich* **30** : 234, 286, ♂ ; Hedicke, 1939, *Hym. Cat.* pars **11** : 31, ♂.
Hemifoenus brevithorax Kieffer, 1911, *Ann. Soc. ent. Fr.* **80** : 182, ♀ ; Kieffer, 1912, Evaniidae in *Das Tierreich* **30** : 192, ♀ ; Turner, 1918, *Ann. Mag. nat. Hist.* (9) **1** : 410, 412 ; Hedicke, 1939, *Hym. Cat.* pars **11** : 50, ♀ (**Syn. nov.**).
Hyptiogaster brevithorax (Kieffer), Crosskey, 1953, *Trans. R. ent. Soc. Lond.* **104** : 374, ♀.

Westwood's type of *F. spinitarsis* bears the label " ? Gold Coast ", and no other information. The wing-venation, mandibles, hind trochanter, and body form serve to place the specimen in *Hyptiogaster*, a genus with an Australasian and Neotropical distribution only ; as the data label on the specimen itself bears a question-mark, and as other material of the same species is known from Australia, Westwood's type is assumed to have been collected in Australia and mistakenly labelled.

A series of specimens of *H. spinitarsis* has been examined, including 12 males and 10 females from the collection of the Deutsche Entomologische Institüt, and 1 male and 4 females from the Canberra collection, together with Kieffer's type specimen (♀) of *brevithorax*. The species varies considerably in size, from 8–12 mm. in length, and in the degree of asymmetry of the hind tarsi ; tarsal asymmetry is more pronounced in females than in males, and in one specimen of the latter sex only the metatarsus showed well-marked asymmetry ; specimens from Tasmania evidently belong to the same species as the mainland Australian form, but there is a suggestion that a cline exists, in that asymmetry is most pronounced in Tasmanian specimens, less clearly marked in near mainland specimens (from Victoria), and least marked in specimens from the north of the species' range at Brisbane. Some specimens show variations which approach *H. interrupta* Crosskey and this may prove to be only a marked variety of *H. spinitarsis* (Westwood).

Acknowledgments.

I am greatly indebted to Mr. E. F. Riek of the Department of Entomology, C.S.I.R.O., Canberra, for the loan of material, and to Professor J. Pasteels, University of Brussels, for making available for study the *Hyptiogaster* collection of the Deutsche Entomologische Institüt.

References.

Brues, C. T., 1922, Parasitic Hymenoptera from the Fiji Islands. *Psyche, Camb., Mass.* **29** : 10–22.

Crosskey, R. W., 1953, A revision of the genus *Hyptiogaster* Kieffer (Hymenoptera : Gasteruptionidae), with descriptions of two new genera and three new species. *Trans. R. ent. Soc. Lond.* **104** : 347–384.

Turner, R. E., 1918, The Hymenoptera of Fiji. *Trans. ent. Soc. Lond.* **1918** : 334–346.

A NEW SPECIES OF *PARAFOLSOMIA* (COLLEMBOLA) FROM INDIA.

By J. T. Salmon, D.Sc., F.R.S.N.Z., F.R.E.S.

(*Victoria University College, Wellington, New Zealand.*)

The occurrence of a species of this Collembolan genus in India is very interesting and serves to extend the distribution of the genus, which is now known from the Subantarctic Islands of New Zealand, New Zealand, Britain, India and East Africa. These specimens were amongst the Indian collection of Collembola made by Miss T. Clay, British Museum (Natural History), which I am at present studying.

Figs. 1–6.—*Parafolsomia trioculata* sp. n. (1) Apex Ant. IV; (2) sense organ of Ant. III; (3) postantennal organ and ocellus in side section; (4) ocelli and postantennal organ; (5) hind foot; (6) mucro and apex of dens.

Genus *Parafolsomia* Salmon, 1949.

Parafolsomia trioculata sp. n. (Figs. 1–6.)

Colour: Pale yellow overlaid dorsally and laterally with deep bluish-black granular pigment; intersegmental margins clear, antennae pale blue; legs deep blue on coxae, otherwise pale blue to yellowish; furcula pale yellow; ocelli on black pigment spot.

Clothing: Well clothed with short simple setae and occasional longer simple setae; setae of appendages all short.

Body : Length to 1·4 mm. Antennae subequal to head in length, the four segments related as 5 : 9 : 15 : 25 ; Ant. IV with apical sensory dome, five to six stout, large, curved sense rods and numerous short setae ; Ant. III with subapical sensory organ of two large, stout, bent sense rods behind low integumentary fold and with a slender, curved, exposed sense rod to one side. Three ocelli to each side, the anterior two often contiguous, but not necessarily so (the two sides of one individual may differ in this respect), the posterior ocellus removed and rather obscured in pigment ; postantennal organ elongate elliptical, very narrow, seven times longer than broad, with a constriction or band across the middle : the whole organ more or less elevated as shown in fig. 3. Rami of tenaculum each with four barbs, the corpus with a short, stout seta to each side.

Legs : Claw without any teeth, but with a medium length stiff, basal seta to each side ; unguiculus short, lanceolate with broad curved inner lamella.

Furcula : Manubrium : dens : mucro as 30 : 29 : 9. Each dens with two prominent corrugations just proximal of half-way down and with eight setae on the posterior face arranged in two irregular rows ; manubrial hooks present ; mucro with small apical tooth and very large sub-apical tooth.

Locality.—Holotype, India : Gangtok, Sikkim ; 6000 ft., amongst dry rotting leaves (*Miss T. Clay*).

Types.—Type and paratypes in the British Museum (Natural History) ; paratypes in author's collection.

Remarks.—Differs primarily from the other known species of *Parafolsomia* by the number of ocelli and structure of the postantennal organ.

ERRATUM

1954, *Proc. R. ent. Soc. Lond.* (*B*) **23** : 215–227.

New East African Termitinae (Isoptera : Termitidae).

By R. M. C. Williams, B.Sc., F.R.E.S.

By an unfortunate error figures 2 and 5 on pages 218 and 225 of the above paper have been transposed so that they are now over the wrong legends.

Figure 2 represents *Noditermes wasambaricus* and Figure 5 *Cubitermes umbratus*.

NEW ALEYRODIDAE (HEMIPTERA: HOMOPTERA) FROM NEW CALEDONIA.

By L. J. Dumbleton, F.R.E.S.

Subfamily Udamoselinae Enderlein.

Genus *Dialeurodicus* Cockerell.

Dialeurodicus elongatus sp. n. (Figs. 1–9.)

Larva (fig. 1).—Length 0·38 mm., width 0·2 mm. Margin without teeth. Ovoid red eye spots half way between mid-dorsal line and margin. Submargin with 17 setae on each side. Two pairs of cephalic setae anterior to eye spots, two pairs of thoracic setae, one pair on first abdominal segment and one pair on eighth abdominal segment cephalad of orifice. Four pairs of medium-sized simple pores midway between mid-dorsal line and margin on abdominal segments three to six inclusive.

Pupal case (figs. 2–4).—Length 1·6–2·1 mm., width 0·65–0·95 mm. Widest at mid-length, flat, elongate, not constricted between thoracic tracheal pores. Colour light brown. Margin crenulated, about 5 or 6 crenulations in 0·1 mm. Submargin (figs. 3 and 4) defined by radial lines and submarginal ridges, each of the latter with a bordered pore or gland occupying the inner end. Mesad of the submargin on each side are 17 setae, which are about as long as the submarginal ridges. Of these setae nine are on the cephalothorax, six anterior to the pore and three posterior, and eight on the abdomen. Between these setae, especially on the cephalo-thorax and the anterior half of the abdomen, is an irregular linear series of small bordered pores. The caudal setae are not differentiated. There are two pairs of para-median cephalic setae and three pairs of para-median thoracic setae. Transverse moulting suture extends to submargin. Thoracic tracheal fold not evident. Thoracic tracheal pore (fig. 3) visible as one or two smaller teeth or crenulations. Abdominal tracheal fold not evident, pore represented by one or two smaller teeth. Abdomen without setae on first segment and with setae on eighth segment cephalad of orifice. Vasiform orifice (fig. 4) 0·13 mm. long, 0·1 mm. wide, subcordate. Operculum sub-rectangular, 0·075 mm. wide, 0·045 mm. long, occupying less than half the orifice and with two short setae on the posterior margin. Lingula occupies full length of orifice, length 0·1 mm., width 0·045 mm., with two subapical setae 0·04 mm. long.

Adult (figs. 5–9).

Male.—Head with rounded vertex. Between base of antenna and eye is a finger-like finely setose process (fig. 5) about 0·1 mm. long and 0·025 mm. wide, equal in length to the first two antennal segments. Antennal segment 3, 0·21 mm. long; 4, 0·04; 5, 0·045; 6, 0·075; 7, 0·07 mm. long. Fore wing (fig. 6) 1·3 mm. long, R1, Rs, M and Cu present, also a clear fold between M and Cu and with dark maculation on proximal half of M and on distal half of Cu. Hind wing 1·0 mm. long with R1 and Rs present and one other vein. Fore femur with a comb of 9 setae on proximal half. Hind tibia with a comb of 16–17 setae. A median ventral truncate-conical process present caudad of the posterior pair of abdominal sternites. Claspers (fig. 8) of genitalia, stout with prominent thumb-like subapical ventral process. Vasiform orifice (fig. 9), transverse subcircular. Operculum transverse, posterior margin concave and with two minute paramedian setae. Lingula exposed, elongate, bluntly pointed, with two subapical setae.

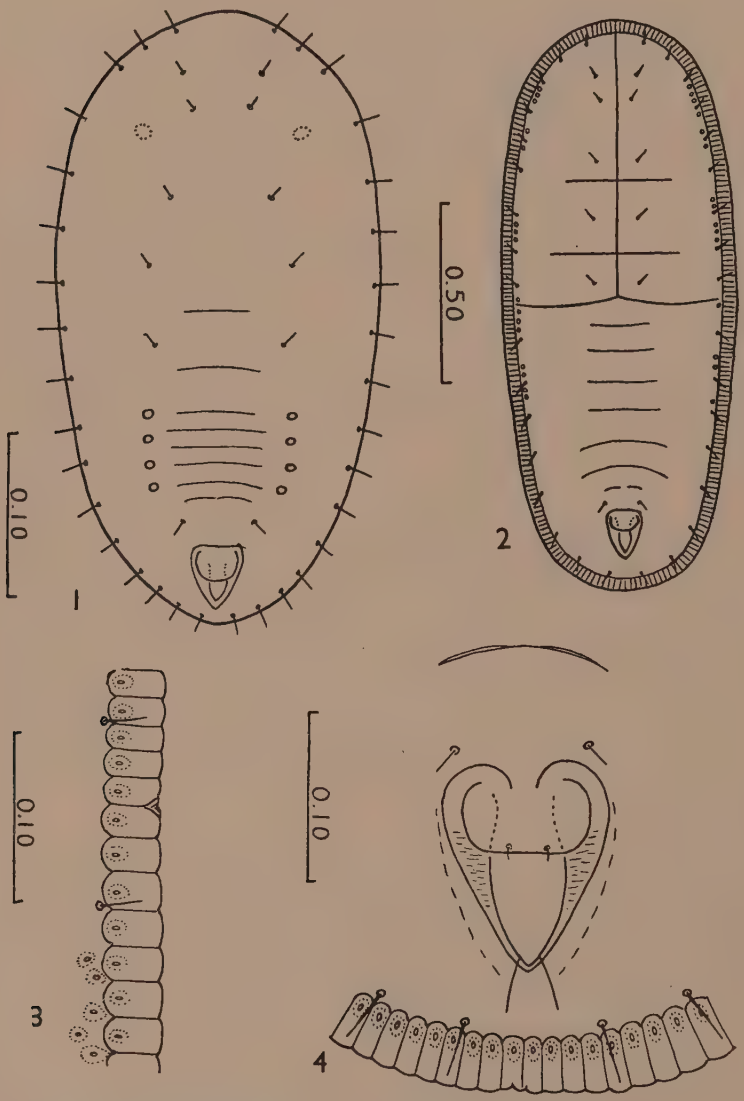
Holotype.—Pupal case on slide mount. Deposited in the Institut Français d'Océanie, Noumea, New Caledonia.

Paratypes.—In the author's collection.

Type locality.—New Caledonia : Anse Vata, Noumea, 20.v.55.

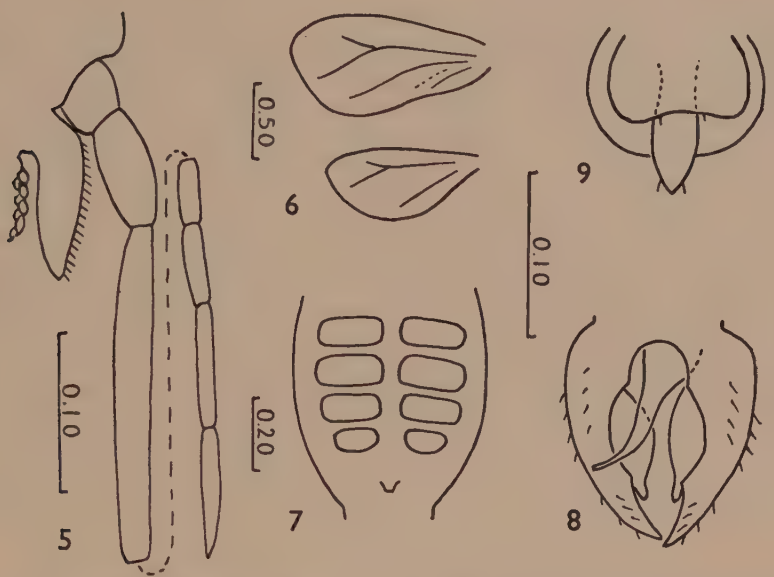
Food plant.—Coconut (*Cocos nucifera*).

What was apparently this species was described and figured as *Aleurodicus destructor* Mackie by Risbec (1942). The abundant long wax filaments, which have a blueish tinge, are similar to those of *destructor*.



Figs. 1–4.—*Dialeurodicus elongatus* sp. n. (1) Larva ; (2) pupal case ; (3) pupal case, margin and thoracic tracheal pore ; (4) pupal case, vasiform orifice, margin and abdominal tracheal pore.

The absence of compound or agglomerate pores would indicate that this species is a *Dialeurodicus*, though there is no cone-shaped process on the vertex of the adult. The claspers of the male are similar to those of *Septaleurodicus mexicanus* Sampson, which has, however, a more reduced wing venation.



FIGS. 5–9.—*Dialeurodicus elongatus* sp. n. (5–8) Adult male: (5) antenna and cephalic process; (6) wings; (7) venter of abdomen and median process; (8) genitalia, claspers and penis; (9) adult female, vasiform orifice.

Subfamily ALEYRODINAE Enderlein.

Genus *Orchamus* Quaintance and Baker.

Orchamus was created as a subgenus of *Aleuroplatus* Q. & B. by Quaintance and Baker (1917) with *A.* (*O.*) *mammaeferus* Q. & B. from Java as the type of the subgenus. The principal diagnostic character given was the series of teeth on the inner caudolateral margin of the vasiform orifice. The existence of numerous papillae in a linear series on the submargin was not mentioned in the subgeneric prescription. Since then *samoanus* Laing and *citri* Takahashi have been placed in this subgenus. The discovery in New Caledonia of six new species of similar facies and all with a linear series of submarginal papillae makes it desirable to raise *Orchamus* to generic rank.

As it is known at present it is restricted to Java, Australia and Pacific Islands. The New Caledonian species are not known to occur elsewhere. The origin of *samoanus*, which may be a synonym of *mammaeferus*, is not known. It was described from Western Samoa and is known to me from Fiji, Rarotonga and Tahiti, but as it occurs commonly on Croton and Citrus it is likely to have been widely spread by man.

The following amended generic prescription is given ;

Pupal case.—Flat, elliptical, often constricted across thoracic combs. Colourless or black. Margin with a single row of crenulations or teeth. Submarginal line often present especially on anterior half of body. A linear series of subcylindrical papillae on submargin and rarely a few laterad on disc of abdomen. Papillae with two apparent side pieces and the margin between their apices notched, Submarginal minute setae and anterior and posterior marginal setae usually present. Thoracic and abdominal tracheal folds present or absent, usually faint, but thoracic folds rarely well marked. Combs present in tracheal pore areas, usually varying from two to many long slender teeth, often invaginated but sometimes nearly continuous with margin and with short rounded well-separated teeth. Usually with a pair of hair-like cephalic setae between the thoracic combs and another pair on the first abdominal segment. One pair of setae on eighth abdominal segment may be distant from base of orifice or situated on it. Eye spots present or absent. Suture between meso- and metathorax usually distinct medially. Transverse moulting suture with a deep or shallow concavity medially which may be rounded or angulate, sides sometimes turning antero-laterally and nearly meeting submarginal line. Abdominal segmentation usually distinct in median line and with five pairs of small paramedian pores present. Vasiform orifice subcircular to subcordate, sometimes with inner caudo-lateral margin toothed. Operculum usually subcordate, nearly filling orifice. Lingula usually concealed, subparallel-sided, apex rounded.

Adult.—Wings white, immaculate, vein R1 absent. Antennae with seven segments. Claspers of male curved and pointed apically and with a sub-apical ventral gibbosity. Penis, in lateral view, curved and tapering. Lingula long, subparallel-sided, apex rounded.

Type species. Orchamus mammaeferus Quaintance and Baker.

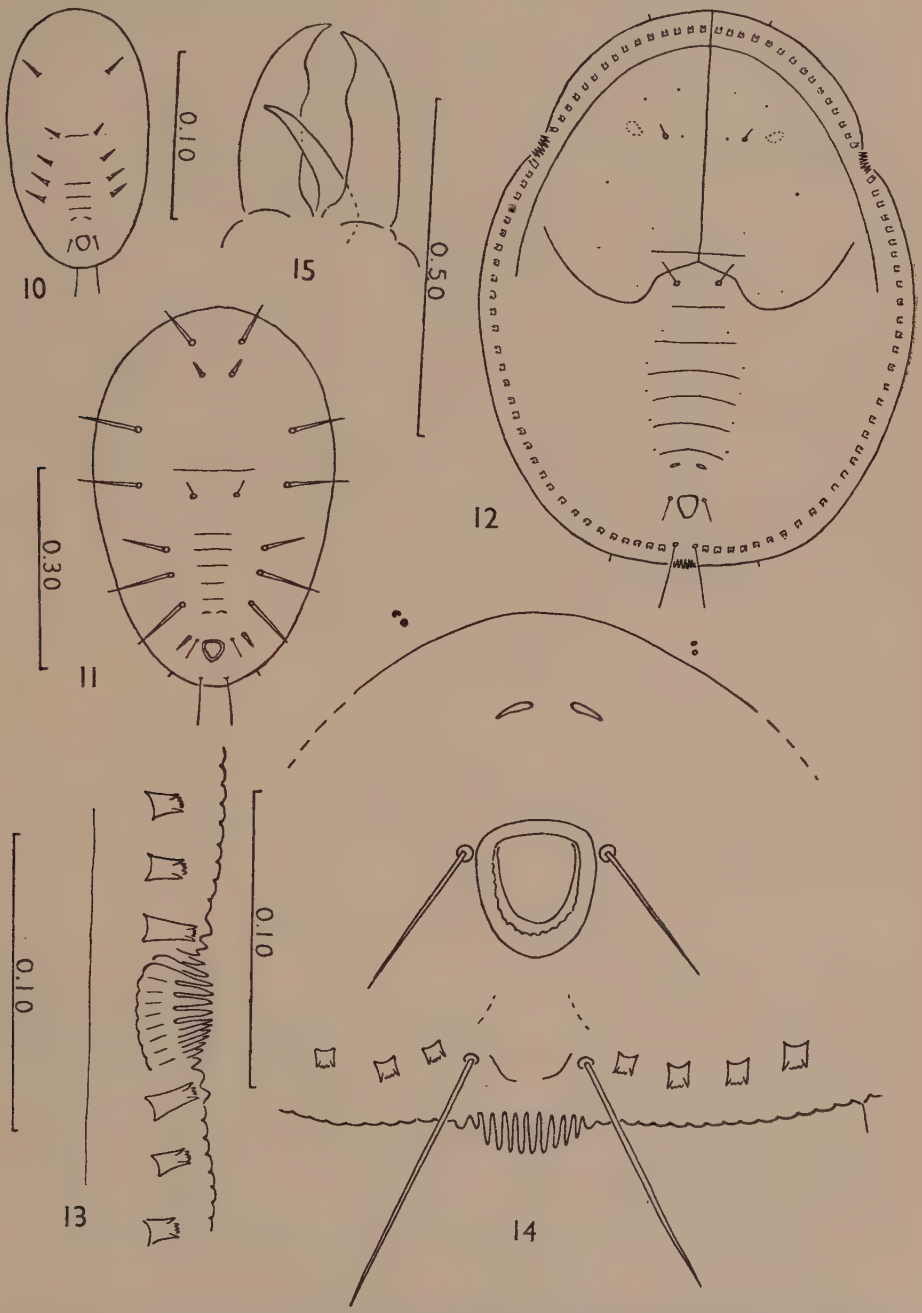
Key to the pupal cases of the genus *Orchamus*.

1 Black species . . . . . (2)
Colourless or pigmented only in median area . . . . . (4)
2 Thoracic tracheal comb with seven or eight short, rounded well-separated teeth; eye spots and submarginal line absent . . . . **plumensis** sp. n.
Not as above . . . . . (3)
3 Margin with strong teeth, thoracic combs deeply invaginated, eye spots subtriangular, touching submarginal line which nearly meets lateral termination of transverse moulting suture . . . **dentatus** sp. n.
Margin crenulated, combs not deeply invaginated, eye spots elliptical, distant from submarginal line which continues caudad of lateral ends of transverse moulting suture . . . . . **caledonicus** sp. n.
4 Papillae confined to single row on submargin, thoracic tracheal fold, if present, narrow and without mesally directed spines at inner end. . (5)
Six or seven papillae laterad on disc of abdomen, tracheal fold wide, with about ten spines at inner end directed mesally . . . **citri** Takahashi
5 With prominent large pore plates mesad of thoracic and cephalad of abdominal tracheal combs . . . . . **porosus** sp. n.
Not as above . . . . . (6)
6 Pigmented in median area . . . . . **incognitus** sp. n.
Unpigmented . . . . . (7)
7 Comb teeth subparallel-sided, apices rounded; caudal setae close together; eighth abdominal setae rising from base of orifice . . . **montanus** sp. n.
Comb teeth tapered, pointed; caudal setae wider at bases; eighth abdominal setae distant from base of orifice . . . . . **samoanus** Laing

(*N.B.*—*mammaeferus* is not included as I have seen no specimens. It is possible that *samoanus* is a synonym of *mammaeferus*.)

Orchamus caledonicus sp. n. (Figs. 10–15.)

Larva (early stage) (fig. 10) with five pairs of stout setae; caudal setae and those of eight abdominal segment hair-like.



Figs. 10–15.—*Orchamus caledonicus* sp. n. (10) Larva, early stage. (11) larva, later stage. (12) Pupal case. (13) Pupal case, margin and thoracic tracheal comb. (14) Pupal case, vasiform orifice, margin and abdominal tracheal comb. (15) Adult male, genitalia, clasper and penis.

Larva (later stage) (fig. 11).—First abdominal, eighth abdominal and caudal setae hairlike. Eight pairs of stout setae, posterior cephalic pair and one pair on eighth abdominal segment much shorter than others.

Pupal case (figs. 12–14).—Length 0·82 mm., width 0·63 mm. Widest at mid-length, flat, elliptical, slightly constricted between thoracic combs. Colour black. Margin crenulated. Anterior and posterior marginal setae present. Submarginal line present, extending to mid-length. Submargin with a single row of papillae, about 14 anterior to comb and 32 posterior to comb on each side. Papillae about 0·05 mm. long and 0·04 mm. wide at base, those adjoining thoracic comb nearly twice as long as others. Papillae distant by their length from margin. Submarginal minute setae present. Caudal setae 0·12 mm. long. Eye spots present, ovoid, distant about 0·05 mm. from submarginal line. A pair of short cephalic setae between eye spots. Transverse moulting suture nearly meeting submarginal line, which ends further caudad. Thoracic tracheal fold not evident. Thoracic tracheal comb (fig. 13) with eight or nine slender tapering, pointed teeth ; central teeth 0·013 mm. long. Bases of teeth separated by lines and internal margin of comb base crenulate or scalloped. Two or three crenulations on margin adjoining comb conically produced. Abdominal tracheal fold faintly indicated. Abdominal tracheal comb (fig. 14) with eight or nine slender teeth 0·01 mm. long and somewhat rounded apically. Two or three adjoining marginal crenulations conically produced. First abdominal segment with one pair of setae 0·08 mm. long, eighth abdominal segment with one pair of setae distant from orifice. Vasiform orifice (fig. 14) 0·045 mm. long, 0·04 mm. wide, posterior internal margin toothed. Operculum subcordate, occupying most of orifice. Lingula short, parallel-sided, rounded apically.

Adult.—Male : Antennal segment 3, 0·15 mm. long ; 4, 0·035 mm.; 5, 0·037 ; 6, 0·05 ; 7, 0·045 mm. Wings white immaculate, R_1 not present. Clasper (fig. 15) of genitalia 0·12 mm. long. Penis 0·1 mm. long, in lateral view, curved, tapering. Lingula long finger-like. Hind tibia with about 29 setae in comb.

Holotype.—Slide mount of pupal case. Deposited in Institut Français d'Océanie, Noumea, New Caledonia.

Paratypes.—In the author's collection.

Type locality.—New Caledonia : Anse Vata, Noumea, 24.v.55.

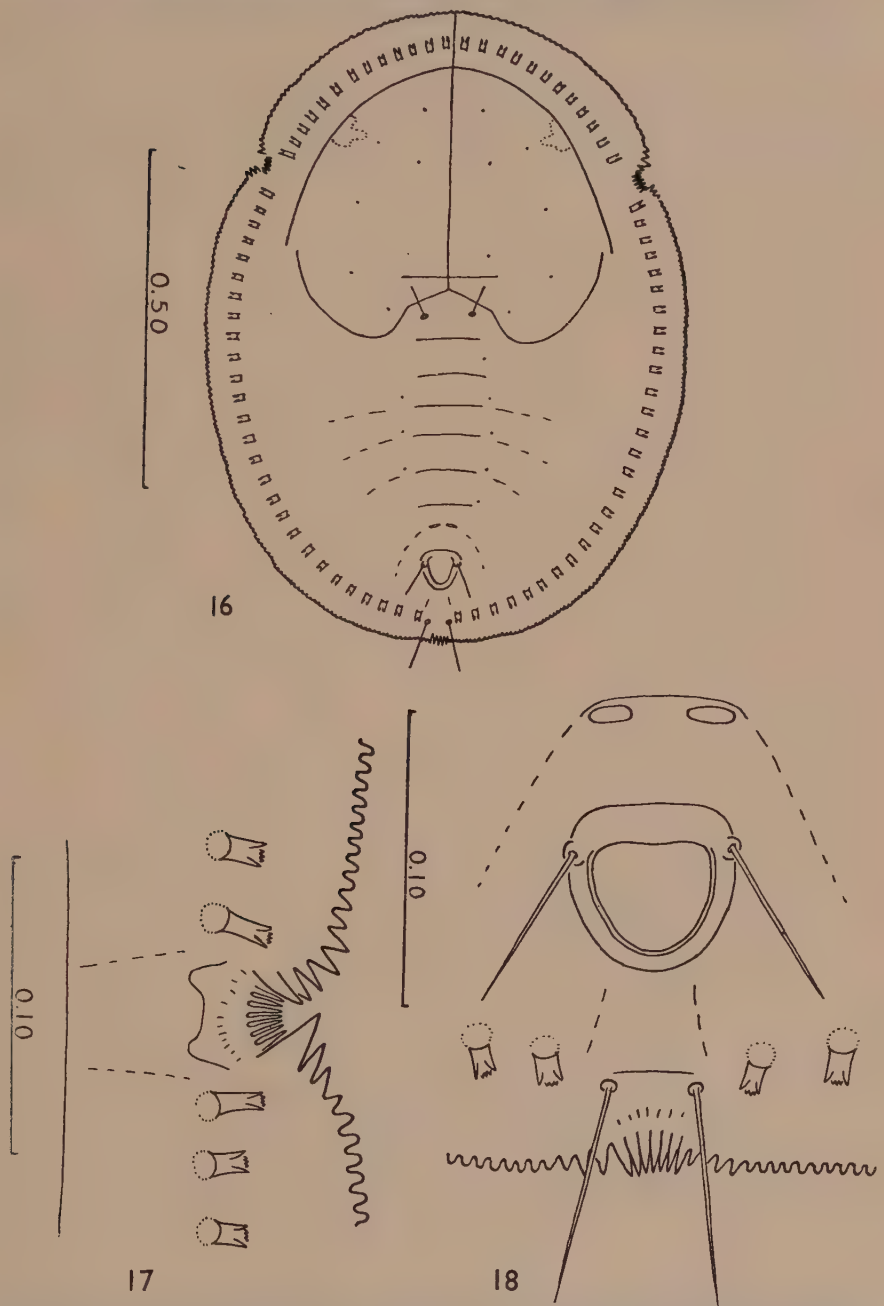
Food plant.—Orange.

This appears to be the species which was recorded from New Caledonia by Williams (1944) as *Aleuroplatus* (*Orchamus*) *samoanus* Laing. Mr. C. E. Pemberton, who kindly examined Williams' specimens for me, informs me that they are black. They are, therefore, not *samoanus* and are probably *caledonicus* sp. n.

Orchamus dentatus sp. n. (Figs. 16–18.)

Pupal case (fig. 16).—Length 0·92 mm., width 0·74 mm. Widest about mid-length, flat, elliptical, deeply constricted across thoracic combs. Colour black. Margin with prominent rounded teeth, as long as wide. Submarginal line about 0·1 mm. distant from margin, ending caudad of thoracic comb and nearly meeting lateral ends of transverse moulting suture. Submargin with a single row of papillae, 13 anterior to comb and 26 posterior to comb on each side, distant by more than their length from the margin, longer than wide, length about 0·01 mm. Those on each side of thoracic comb 0·015 mm. long, those adjoining abdominal comb not longer than others. Caudal setae about 0·1 mm. long. Eye spots irregular, somewhat triangular, cephalad of line between thoracic combs and contiguous with submarginal line. Thoracic tracheal fold faintly indicated. Three or four marginal teeth on each side of comb increasing in length and becoming more conical as they approach comb. Thoracic tracheal comb (fig. 17) deeply invaginated with seven or eight slender, tapering, pointed teeth, free portion 0·013 mm. long, basal portions separated by lines and comb base bounded internally by a line. Abdominal thoracic fold faintly indicated if at all. Abdominal thoracic comb (fig. 18) with six or seven teeth about 0·013 mm. long. Marginal

teeth on each side longer and more conical. First abdominal segment with one pair of setae about 0·1 mm. long. Setae of eighth abdominal segment arising from prominent tubercles on base of orifice, length 0·05 mm. Vasiform orifice (fig. 18) subcordate, width 0·06 mm. Operculum subcordate, occupying whole orifice. Lingula not evident.



FIGS. 16–18.—*Orchamus dentatus* sp. n. (16) Pupal case. (17) Pupal case, margin and thoracic tracheal comb. (18) Pupal case, vasiform orifice, margin and abdominal tracheal comb.

Holotype.—Pupal case on slide mount. Deposited in Institut Français d'Océanie, Noumea, New Caledonia.

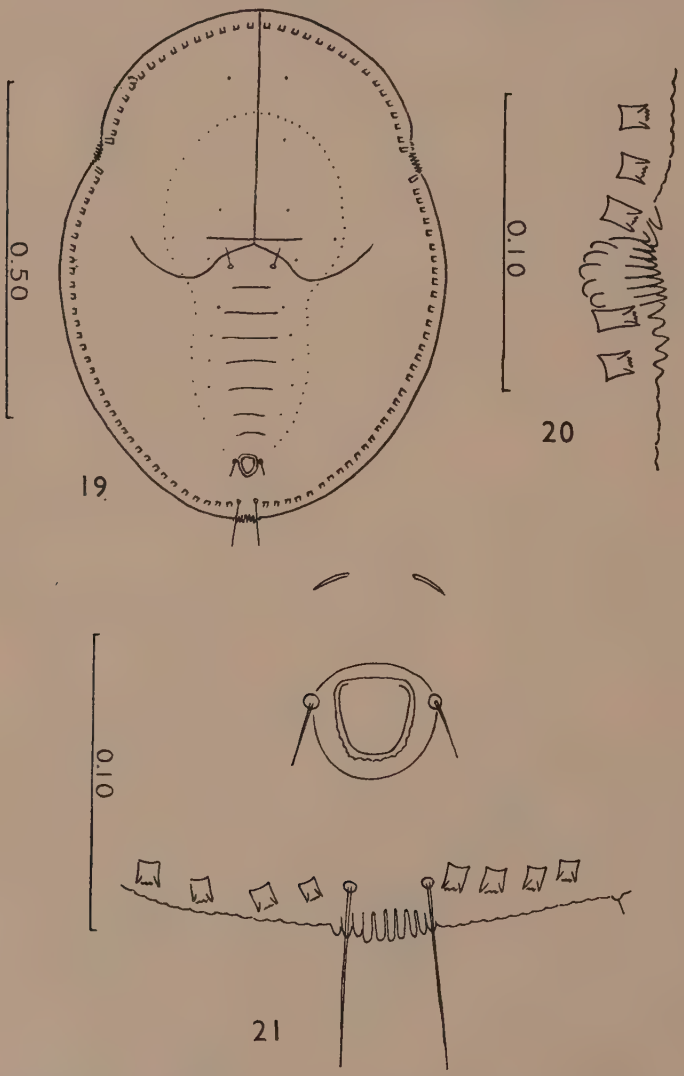
Paratypes.—In the author's collection.

Type locality.—New Caledonia: Carenage, 8.iv.55.

Food plant.—Myrtaceous plant ? *Moorea artensis* Montr.

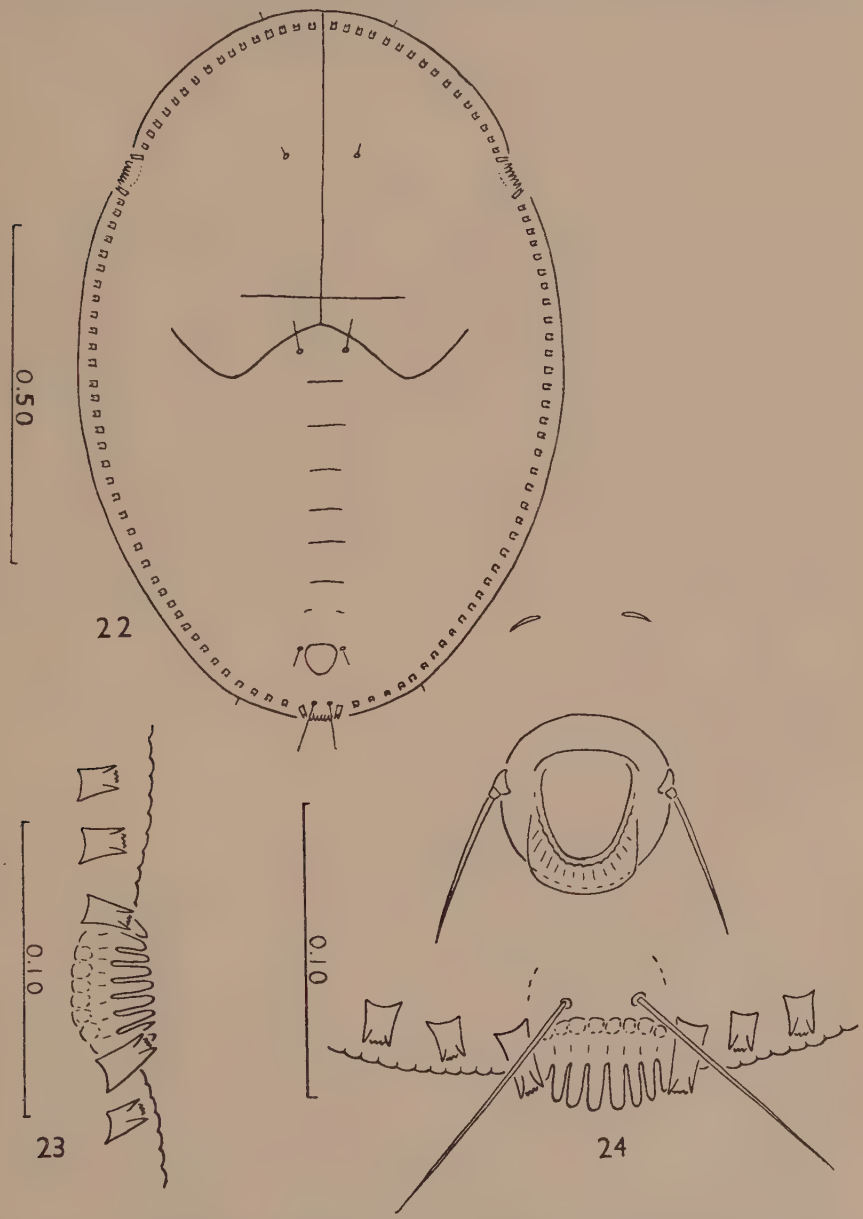
Orchamus incognitus sp. n. (Figs. 19–21.)

Pupal case (fig. 19).—Length 0·77 mm., width 0·56 mm. Widest at mid-length, flat, elliptical, slightly constricted across thoracic tracheal combs. Colourless except for median area, which is light brown. Margin crenulated. Posterior marginal setae present. Sub-



Figs. 19–21.—*Orchamus incognitus* sp. n. (19) Pupal case. (20) Pupal case, margin and thoracic tracheal comb. (21) Pupal case, vasiform orifice, margin and abdominal tracheal comb.

marginal line not evident. Single row of papillae on submargin, about 16 anterior and 33 posterior to comb on each side. Papillae slightly longer than width at base, those on each side of thoracic comb slightly longer than others. Caudal setae 0·07 mm. long. Eye spots absent. Thoracic tracheal fold not evident. Thoracic tracheal comb (fig. 20) with six or seven teeth 0·013 mm. long and slightly rounded apically. Two or three marginal teeth adjoining comb conically produced. Bases of comb teeth divided, interior margin of comb



FIGS. 22–24.—*Orchamus montanus* sp. n. (22) Pupal case. (23) Pupal case, margin and thoracic tracheal comb. (24) Pupal case, vasiform orifice, margin and abdominal tracheal comb.

base crenulate or scalloped. Abdominal tracheal fold not evident. Abdominal tracheal comb (fig. 21) with about eight teeth, rounded apically and not strongly tapered. First abdominal segment with one pair of setae 0·03 mm. long. Setae of eighth abdominal segment 0·015 mm. long, on or close to base of orifice. Vasiform orifice (fig. 21) subcircular, 0·04 mm. wide, 0·035 mm. long, posterior internal margin toothed. Operculum elongate sub-rectangular, filling orifice. Lingula not evident.

Holotype.—Pupal case on slide mount. Deposited in the Institut Français d'Océanie, Noumea, New Caledonia.

Paratype.—In the author's collection.

Type locality.—New Caledonia. Coll. F. Cohic.

Food plant.—Undetermined.

Orchamus montanus sp. n. (Figs. 22–24.)

Pupal case (fig. 22).—Length 1·05 mm., width 0·7 mm. Widest at midlength, flat, elliptical, slightly constricted between thoracic combs. Colourless. Margin crenulated. Anterior marginal setae present. Submarginal line not evident. Submargin with a single row of papillae, 18 anterior to comb and 40 posterior to comb on each side. Papillae 0·012 mm. long, 0·01 mm. wide at base, distant less than their length from margin, those adjoining comb much longer. Submarginal minute setae present. Eye spots absent. Two paramedian setae between thoracic combs. Caudal setae 0·09 mm. long, bases close together. Thoracic tracheal fold not evident. One or two marginal crenulations adjoining comb produced as conical teeth. Thoracic tracheal comb (fig. 23) with seven or eight teeth 0·015 mm. long, finger-like with rounded apices and subcircular bases. Abdominal tracheal fold faint. Abdominal tracheal comb (fig. 24) with seven or eight teeth 0·015 mm. long, similar to those of thoracic comb. First abdominal segment with two setae 0·05 mm. long. Setae on eighth abdominal segment on base of orifice, 0·05 mm. long. Vasiform orifice (fig. 24) with posterior rim raised, thin, and folded over in mounts showing the ridges which end on the rim as teeth, subcircular, 0·06 mm. wide. Operculum subcordate, filling orifice. Lingula not evident.

Holotype.—Pupal case on slide mount. Deposited in Institut Français d'Océanie, Noumea, New Caledonia.

Paratypes.—In the author's collection.

Type locality.—New Caledonia: Montagne des Sources, 7.xii.54.

Food plant.—Undetermined Cunoniiaceous plant.

Orchamus plumensis sp. n. (Figs. 25–29.)

Larva.—Length 0·7 mm. Two pairs of paramedian cephalic setae, one pair first abdominal, one pair eighth abdominal and one pair caudal setae, all hair-like. One pair anterior cephalic, one pair thoracic, one pair first abdominal, three pairs abdominal setae on segments 5–7, all short, stout, conical.

Pupal case (fig. 26).—Length 0·88 mm., width 0·62 mm. Widest behind mid-length, flat, elliptical, very slightly constricted across thoracic combs. Colour black. Margin with rather weak crenulations. Submarginal line not evident. Submargin with a single row of papillae, 12–13 anterior to thoracic comb and 26 posterior to comb on each side. Papillae wider at base than length, length 0·01 mm., somewhat strongly tapered; those adjoining combs little if at all longer. Caudal setae 0·05 mm. long. Eye spots absent. One pair of setae between anterior margins of thoracic combs. Thoracic tracheal fold not evident. Thoracic tracheal comb (fig. 27) consisting of about seven short rounded teeth, length of teeth 0·005 mm., slightly longer than wide, tips in a straight line. Abdominal tracheal fold faintly indicated. Abdominal tracheal comb (fig. 28) with about six teeth, 0·01 mm. long, longer than wide, apices rounded, well separated, tips in a straight line. First abdominal segment with one pair of setae. Setae on eighth abdominal segment rising from prominent

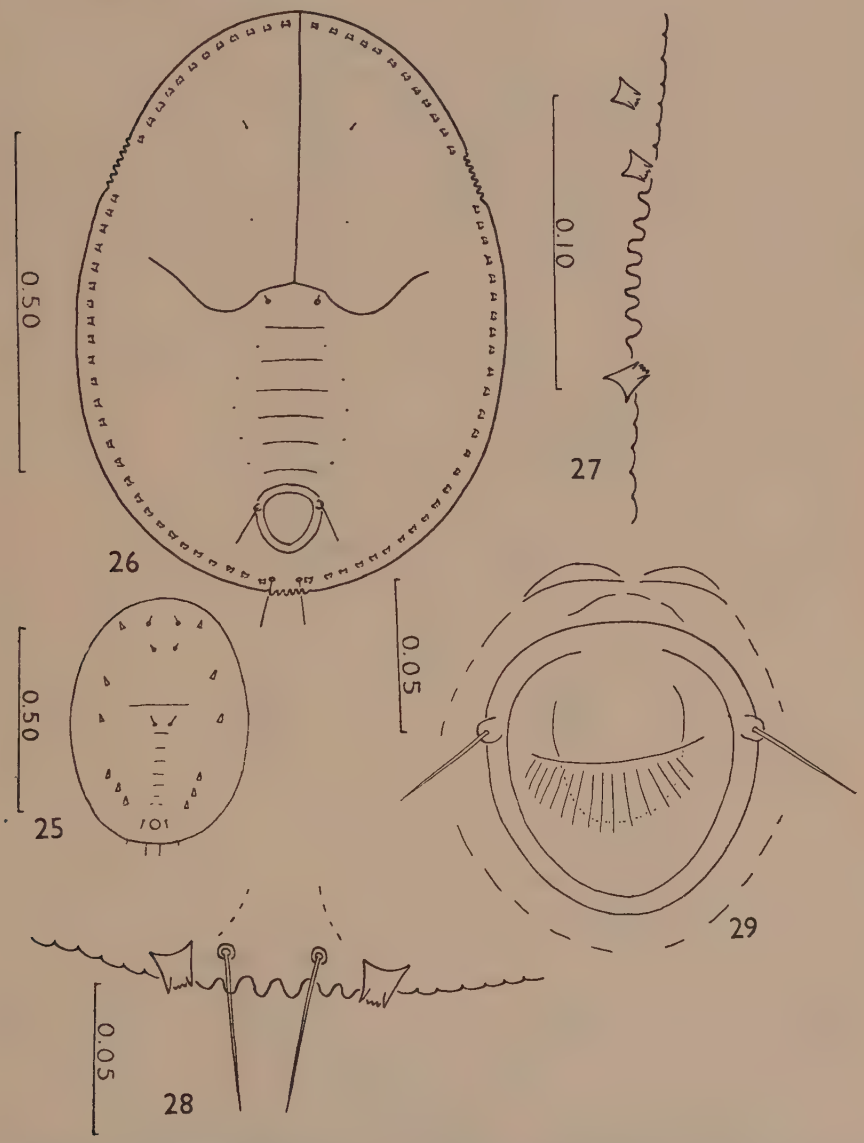
tubercles on base of orifice, 0·03 mm. long. Vasiform orifice (fig. 29) subcircular, 0·1 mm. long, posterior rim thin and in the mount folded over so that the ridges ending as teeth are evident. Operculum subcircular. Lingula not evident.

Holotype.—Pupal case on slide mount. Deposited in Institut Français d'Océanie, Noumea, New Caledonia.

Paratypes.—In the author's collection.

Type locality.—New Caledonia: Plum.

Food plant.—Undetermined.



Figs. 25–29.—*Orchamus plumensis* sp. n. (25) Larva. (26) Pupal case. (27) Pupal case, margin and thoracic tracheal comb. (28) Pupal case, margin and abdominal tracheal comb. (29) Pupal case, vasiform orifice.

Orchamus porosus sp. n. (Figs. 30–32.)

Pupal case (fig. 30).—Length 0·90 mm., width 0·62 mm. Widest at mid-length or slightly before, flat, elliptical, slightly constricted across thoracic combs. Colourless. Margin slightly crenulated. Anterior and posterior marginal setae present, submarginal line not evident. Single submarginal row of papillae, 0·07 mm. long, 0·05 mm. wide at base, distant by their length from margin, 14–15 anterior to thoracic comb and 35–38 posterior to comb on each side. Submarginal minute setae present, sparse. Caudal setae 0·09 mm. long, widely separated, bases 0·11 mm. apart. Eye spots absent. Two setae between anterior margins of pore plates. Thoracic tracheal fold not evident. Thoracic tracheal comb (fig. 31) completely invaginated, with two teeth 0·01 mm. long. Mesad of the comb is a prominent pore plate 0·115 mm. long and 0·06 mm. wide, the long axis parallel to the margin and bearing numerous closely packed subcircular or subhexagonal pores about 0·003–0·004 mm. in diameter. The pores are absent from an area extending mesad from the comb base to two-thirds the width of the plate. Abdominal tracheal fold not evident. Abdominal tracheal comb (fig. 32) invaginated, with two teeth each 0·008 mm. long. Cephalad of comb is a horseshoe-shaped pore plate which encloses the orifice posteriorly and laterally. Total width of plate 0·14 mm., more or less divided in median line by base of comb leaving only a single row of pores. First abdominal segment with one pair of setae 0·04 mm. long. Setae on eighth abdominal segment 0·03 mm. long, distant from and anterior to orifice. Vasiform orifice (fig. 32) 0·06 mm. long, 0·05 mm. wide. Operculum subtriangular, filling two-thirds of orifice. Lingula exposed, subparallel-sided, apex rounded.

Holotype.—Pupal case on slide mount. Deposited in Institut Français d'Océanie, Noumea, New Caledonia.

Paratypes.—In the author's collection.

Type locality.—New Caledonia: Carenage, 8.iv.55.

Food plant.—Myrtaceous plant ? *Moorea artensis* Montr.

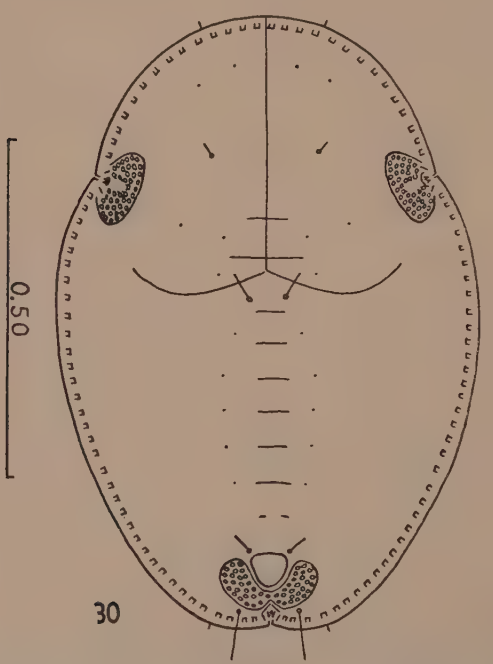
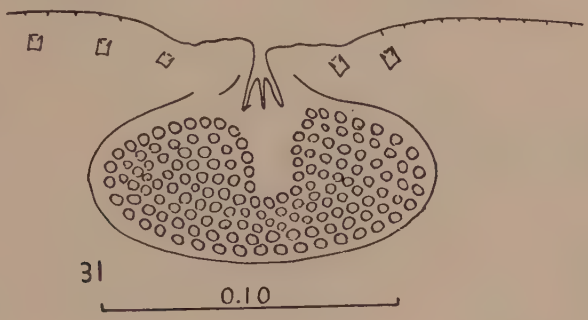


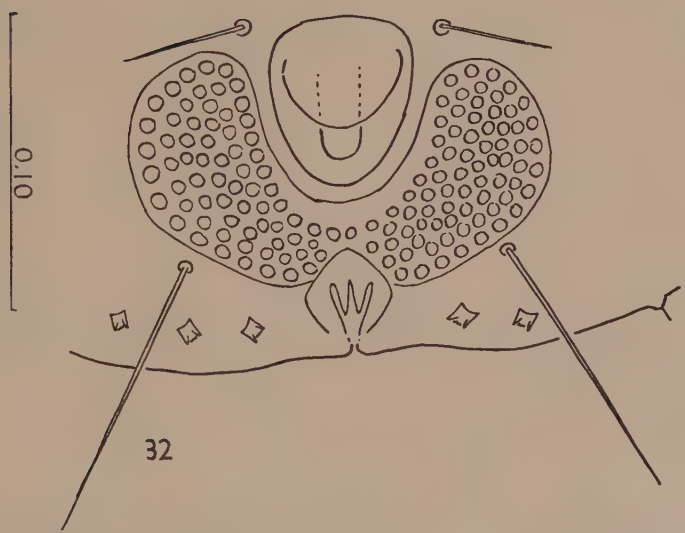
Fig. 30.—*Orchamus porosus* sp. n. Pupal case.

Summary.

Seven new species—*Dialeurodicus elongatus*, *Orchamus caledonicus*, *O. dentatus*, *O. incognitus*, *O. montanus*, *O. plumensis* and *O. porosus*—are described from New Caledonia.

Orchamus Quaintance and Baker, a subgenus of *Aleuroplatus*, is raised to generic rank and a key to the species included is given.





Figs. 31–32.—*Orchamus porosus* sp. n. (31) Pupal case, margin and thoracic tracheal comb. (32) Pupal case, vasiform orifice, margin and abdominal tracheal comb.

References.

Quaintance, A. L., and Baker, A. C. 1917, A contribution to our knowledge of the white flies of the subfamily Aleyrodinae (Aleyrodidae). *Proc. U.S. nat. Mus.* **51**: 400–401.

Risbec, J., 1942, *Observations sur les Insectes des Plantations en Nouvelle Caledonie.* Secretariat d'état aux colonies. Direction des affaires economiques, Section Technique d'agriculture tropicale. Imprimerie Nationale, Paris, 128 pp.

Williams, F. X., 1944, A survey of the insect pests of New Caledonia. *Hawaii. Plant. Rec.* **48**, No. 2.

NEW SPECIES OF *ATHERIMORPHA* WHITE FROM SOUTH AFRICA (DIPTERA: ERRINIDAE).

By B. R. Stuckenberg, M.Sc., F.R.E.S.

(*Natal Museum, Pietermaritzburg, South Africa.*)

The genus *Atherimorpha* White is of particular interest on account of its discontinuous geographical distribution. The known species occur only in the temperate parts of South America (Malloch, 1932) and Australia (Hardy, 1919), and in Tasmania (White, 1914) and South Africa (Bezzi, 1926). The genus thus represents an " Antarctic " element in the South African fauna and also provides a rare instance of such an element occurring in all three of the principal southern zoogeographical regions. Only a single species, *albipennis* Bezzi, has been described from South Africa, the type locality being in the South-western Cape Province. In this paper I am describing two new species from Basutoland and a new species from the Western Cape.

Malloch (1931) has questioned the correctness of Bezzi's generic placement of *albipennis*. His query may have been prompted by Bezzi's erroneous statement that the antennal style is unsegmented in that species. Actually the style is segmented in *albipennis*, as it is in all the other described species of *Atherimorpha*. I have had for examination two Australian species of the genus, kindly donated by Dr. I. M. Mackerras, and a comparison of these with the four South African species leaves no doubt that they are cogeneric.

All the South African species are closely similar, and form a well-defined group within the genus distinguished by the following set of characters:

1. The eyes are widely separated in the males of all four species. This feature occurs elsewhere only in the type species, *vernalis* White, from Tasmania, the Australian and Neotropical species having the eyes of the males contiguous (Malloch, 1932 : 206).
2. The arrangement of the hairs on the mesonotum is most distinctive; these hairs are distributed only on the dark longitudinal stripes and are completely absent from the broad, pale strips on each side of the median stripe. As the median stripe is very narrow in all the species, the hairs in the median line are arranged almost linearly or in two close, indistinct, linear series. This feature does not seem to occur in exotic species of *Atherimorpha*.
3. The postalar declivity is bare in the South African species. Malloch (1931) placed the South American species in a separate subgenus, *Philippoleptis*, on the supposed absence of hairs in the postalar declivity in those species, but subsequently (1932) he found that this character was not constant.
4. In the two Australian species that I have seen there are quite numerous, long, soft, white hairs on the scutellum. Three of the South African species have only dark, bristle-like hairs on the scutellum; the fourth species has all the scutellar hairs long, soft and pale.

The South African species agree with the Australian species in having the setulae on the wing-veins confined to the first radial vein. The Neotropical species, on the other hand, exhibit considerable variation in the distribution of

these setulae which may occur on any of the wing-veins (Malloch, 1932 : 206). Three of the species dealt with below have the wings very broadly rounded outwardly.

It seems that the South African species could be separated subgenerically on the character of the mesonotal hairs mentioned above. A subgenus is not proposed at present because it is reasonably certain that there are further undescribed species in South Africa and these may exhibit an intermediate condition of that character.

Key to the South African species of *Atherimorpha*

1. Wing-membrane milky-white. Legs light testaceous brown **albipennis** Bezzi
   Wing-membrane not white, infuscated or subhyaline. Legs dark brown 2
2. Hairs on coxae black . . . . . **sp. n.**
   Hairs on coxae white 3
3. Smaller species (wing-length 6·2 mm.). Tibial spicules as long as or longer than tibial diameter. Width of head not as great as three times width of frons at level of anterior ocellus. Wing-veins strong. Ocellar tubercle normal . . . . . **bevisi** sp. n.
   Larger species (wing-length 7·4 mm.). Tibial spicules weaker, distinctly not as long as tibial diameter. Width of head about four times width of frons at level of anterior ocellus. Wing-veins thin. Ocellar tubercle prominently raised . . . . . **latipennis** sp. n.

Atherimorpha albipennis Bezzi, 1926.

I have seen the holotype and some topotypical specimens of this species, which is structurally very similar to *bevisi*. The following characters seem to be critical.

Gray dust on body with silvery sheen, hairs on abdomen strongly shining. Legs testaceous, the spicules black and short. Central part of occiput markedly concave. Antennal style 5-segmented, the segments not very obvious in dried condition, tapering only slightly, the apical segment long, slender, equal to remaining four segments. Ratio of width of frons at level of anterior ocellus to width of head 1·0 : 3·3. Frons about as long as ocellar triangle and very sparsely haired. Wings milky-white.

Atherimorpha bevisi sp. n.

Similar to *albipennis* in size and habitus ; differing from that species in having infuscated wings, the dust on the thorax and abdomen of darker gray hue, the frons broader, the occiput distinctly less concave, the legs dark, the tibial spicules stronger and longer, and with more numerous and stronger hairs on the frons and ocellar tubercle.

Male.—Length 5·5 mm., wing 6·2 mm.

Occiput, vertex, narrow lateral margins of frons, face, most of thorax and coxae gray-dusted (nearest " Deep Gull Gray " of Ridgway's *Colour Standards and Nomenclature*). Face with an obscure median brown mark. Frons brown-dusted with a narrow gray strip along each orbit. Antennae and legs dark brown, femora thinly gray-dusted. Upper part of mesopleuron slightly tinged with brown. Mesonotum distinctly marked with brown as follows : a narrow median stripe extending along the whole length of the mesonotum, becoming black posteriorly ; lateral parts of notum with extensive though not well defined

stripes which end sharply at the dorsocentral lines, merging outwardly with gray dust, quite broadly interrupted at the suture, poorly defined behind the suture and not attaining the margin of the scutellum. Abdomen gray-dusted admixed with brown.

Basal two antennal segments short and subequal, third segment much longer, subovate, laterally flattened. Style composed of five segments, the basal four subequal in length, but decreasing markedly in diameter apically, the third and fourth segments only half as thick as the first; apical segment elongated, cigar-shaped, as long as the preceding three segments together. Head broader than thorax. Ratio of width of frons at level of anterior ocellus to width of head 1·0 : 2·71. Inner orbits almost parallel, slightly divergent away from the antennae. Length of frons a little greater than length of ocellar triangle. Ocellar tubercle moderately raised, not prominent in lateral view. Pretentorial pit occupying a small part of the facial suture on the underside of the head, very deep and short, not attaining the base of the antenna; as in *albipennis*. Upper part of occiput only a little concave, not nearly as much as in *albipennis*.

Hairs on lateral and upper parts of occiput black, very stiff, erect, quite long, arranged in two irregular series along the posterior orbits. No pale hairs on upper part of occiput. Frons and ocellar tubercle with numerous similar stiff hairs which are all proclinate. Gray lateral margins of frons not haired. Pile on undersurface of head short, silvery-white. Hairs of dorsum stiff, erect, long, arranged in the manner described above. Row of hairs on pleurotergite long, reaching almost to lower margin of scutellum as in *albipennis*. Hairs on abdomen sparser than in *albipennis*, shining, slightly yellowish-white. Tibial spicules black, long, equal to or a little longer than tibial diameter. Tibial spurs very long, testaceous with black tips.

Wings smoky-brown, with an elongate brown stigma. Veins brown, the first and third veins darker; all the veins quite heavy. Halteres long, yellowish-brown, attaining almost the mid-point of the hind coxae when hanging down.

Holotype ♂, paratopotype, ♂, BASUTOLAND: Giant's Castle, 27.ii.1939 (*L. Bevis*); paratypes, 5 ♂, BASUTOLAND: Mokhotlong River, 16.ii.1939 (*L. Bevis*). Type material in Durban Museum, except 3 paratypes retained in Natal Museum.

The paratypes show slight variations in the width of the frons which, in a few specimens, is a little broader than in the holotype. Some specimens have the frons very sparsely haired, with less than six hairs, which are, nevertheless, quite long. The colour of the mesonotal stripes is also rather variable, being very dull brown or almost sooty in some individuals.

This species is named in honour of Mr. L. Bevis, Assistant-Director of the Durban Museum and Art Gallery.

Atherimorpha latipennis sp. n.

Larger than both *albipennis* and *bevisi*. The abdomen is distinctly elongated, the wings proportionately very large and broad. Head small in proportion to body. Distinguished by the larger size, prominent ocellar tubercle (fig. 1) and large ocelli, the small, strongly transverse, sparsely haired frons, the short line of hairs on the pleurotergites, and other characters mentioned below.

Male.—Length 6·8 mm., wing 7·4 mm.

Dust of thorax and abdomen gray admixed with brown. Dorsum of thorax dark gray with three dull brown stripes of which the median stripe is very narrow. Lateral stripes continue from their anterior ends around the notopleural margins as poorly defined mar-

ginal bands of brown. Occiput gray-dusted, frons yellowish-brown dusted. Legs dark brown.

Only the basal two segments of each antenna present in the holotype; these short, the second blackish. Head only a little broader than the thorax. Occiput very slightly concave. Ocellar tubercle very prominent, elevated, turret-like, the ocelli large and conspicuous. Frons comparatively narrow, ratio of its width at level of anterior ocellus to width of head 1 : 4. Frons also very short, much shorter than length of ocellar triangle and hence strongly transverse ; its anterior margin indicated by a line joining the corners of the eyes. Pretentorial pit very long and deep, occupying much of the length of facial suture, extending to the base of the antenna, the median portion of the face long and narrow. Abdomen long, drooping, tapering only slightly.

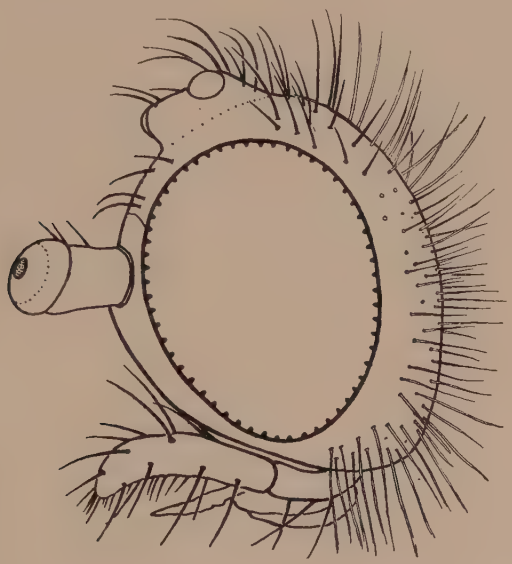


Fig. 1.—*Atherimorpha latipennis* sp. n. Head of holotype ♂.

Dark hairs on upper surface of head erect, not as long or as strong as in *bevisi*. Ocellar tubercle sparsely haired, the hairs proclinate, shorter anteriorly. Frons with only six very short dark hairs. Hairs on mesonotum arranged as described above, stiff, not comparatively as long or as strong as in the preceding two species ; they become softer and paler posteriorly and on the scutellum are long, soft and white. Hairs on upper and lateral parts of occiput not seriate, mixed with silvery-white hairs on the sides. Line of hairs on pleurotergite extending over only half the transverse width of that sclerite. Abdominal hairs numerous, soft, shining white, quite long on the tergites. Spicules on tibiae black, fine, much shorter than the tibial diameter.

Wings slightly pearly, grayish hyaline. Proportionately very large and broad. Costal cell slightly infuscated, stigma dull yellowish-brown. Veins noticeably thin, the wing appearing to be very flexible and not strongly ribbed ; veins mostly brown, first radial vein dark brown and very strong. Halteres very long, the knob dull dark yellowish-brown, exceeding the level of the apex of the posterior coxae when hanging down.

Holotype ♂, Basutoland : near Sani Pass (on Natal border), 25.xii.1938 (*L. Bevis*). In the Durban Museum.

Atherimorpha sp. n.

I have found a single male of a third new species of *Atherimorpha* in the collection of the South African Museum, Cape Town. Unfortunately the specimen has been badly damaged by *Anthrenus* and is not in sufficiently good condition to serve as a holotype. Consequently the species is not named. However, it seems desirable to give a brief description as the locality from which the specimen came is remote and the species may not be found again for a long time.

Male.—Length approximately 6·25 mm., wing 6 mm.

A little larger and more robust than *bevisi*. Dust on thorax and abdomen dark gray, Legs very dark brown, femora thinly gray-dusted. Frons slightly darker than occiput, broader than high, with quite numerous, proclinate, dark hairs. Third antennal segment ovate, strongly flattened laterally in dried condition. Style thinner than in either *albipennis* or *bevisi*, the basal segment annular, hardly distinguished from the third segment, second segment much narrower, apical three segments very slender, the whole style as long as the antenna. Distinct in having the hairs on the coxae black, and not white as in *bevisi* and *latipennis*; *albipennis* has mixed black and white coxal hairs. Wings a little shorter than body and comparatively smaller than in the other species, also less broadly rounded outwardly; wing-membrane infuscated, the veins dark brown and heavy; stigma dirty yellowish-brown; anal cell just closed in both wings—in all the other species this cell is narrowly open. Spicules on tibiae black, mostly shorter than the tibial diameter, a few as long.

Male, South Africa, Western Cape Province: Rivier Zonder End, altitude 5300 ft. (*R. Tucker*). In South African Museum.

References.

Bezzi, M., 1926, South African Rhagionidae (Diptera) in the South African Museum. *Ann. S. Afr. Mus.* **23**: 297–324.

Hardy, G. H., 1919, Australian Rhyphidae and Leptidae. *Pap. Roy. Soc. Tasm.* **1919**: 117–129, pl. 27.

Malloch, J. R., 1931, Notes on Australian Diptera: 28. *Proc. Linn. Soc. N.S.W.* **56**: 273–276.

——, 1932, *Diptera of Patagonia and South Chile. Rhagionidae.* Part 5, fasc. 3: 199–235, Brit. Mus. (Nat. Hist.).

White, A., 1914, The Diptera-Brachycera of Tasmania. Part 1: Families Leptidae, Stratiomyiidae, Nemestrinidae, Cyrtidae. *Pap. Roy. Soc. Tasm.* **1914**: 35–75.

ON THE GENUS *TRICHOMYIA* HALIDAY (DIPTERA : PSYCHODIDAE), WITH DESCRIPTIONS OF FOUR NEW SPECIES.

By G. H. Satchell.

(*The Museum, Dunedin, New Zealand.*)

The genus *Trichomyia* was created by Haliday in 1839 to contain a single species, *T. urbica* Hal. His description referred to the wing venation only and no satisfactory account of the genitalia of this species has since been given. The genus remained monotypic until 1902, when Coquillet described *T. cirrata* from Central America. This widespread species has since had two supposedly new genera created for it ; *Lepria* (Enderlein, 1936) and *Eubonetia* (Vargas and Najera, 1953), both of which should be sunk in *Trichomyia*. Loew's (1845) genus *Diplonema*, created to receive a fossil species, *D. buceras*, from copal, is almost certainly cogeneric with *Trichomyia* and arguments for sinking it will be put forward later in this paper. Since 1902 some ten fossil and ten recent species of the genus have been described, and a further four new species, that I have come across in collections recently, await description. In this paper these new species will be described ; new accounts of the type species and of *T. cirrata* will be given, and the genus will be redefined in the light of this new material.

Trichomyia Haliday, 1839.

Haliday, 1839, *in* Curtis, *British Entomology* : 745.

Mandibles not developed ; antennae 15-segmented.

Wing with *Rs* 3-branched, only one vein intervening between the two forked veins, *Cu* long, reaching approximately to the level of the middle of the wing ; wing vestiture well developed, either hairy or scaly, confined to the veins ; male genitalia rotated, the aedeagus symmetrical and the cercopods lamellate and lacking any retinacular spines.

Type species, *Trichomyia urbica* Haliday, 1839 by monotypy.

Synonyms.

(1) *Diplonema* Loew, 1845.

Loew, H., 1845, *Dipterologische Beitrage* **1** : 7.

Loew created this genus to contain his species *D. buceras* from copal. In 1850 he added two further species, *D. longicornis* and *D. brevicornis*, to it. I have not seen the type species and I suspect it is no longer in existence, having been destroyed with the collections of amber insects at the Königsberg Museum during the last war. But the figure of the wing of *D. buceras* is exactly like that of a *Trichomyia*, and the S-shaped ascoids, mentioned by Loew as being a generic distinction, are, in fact, not so, being shared by species like *Trichomyia congoensis* sp. n. Moreover, I have been able to examine the type specimen of *D. longicornis* Loew in the collection of fossil insects in the British Museum. It is a beautifully preserved specimen in which not only the wing venation, but also the male

genitalia and even the ascoids on the antennae, are visible. It is undoubtedly a species of *Trichomyia*. For these reasons I propose to sink the genus *Diplonema* Loew, 1845, in *Trichomyia* Haliday, 1839.

(2) *Lepria* Enderlein, 1936.

Enderlein, G., 1936, *Dtsch. ent. Z.* **1936** : 112.

Enderlein created this genus to contain a species of his from Central America, *L. squamosa*. In his long generic diagnosis the feature which stands out most noticeably is the supposed absence of a subcostal vein. Through the kindness of Dr. Peus I have been able to examine the type in the Humboldt Museum and find that *Sc* is present and that the insect is, in fact, a rather damaged specimen of *Trichomyia cirrata* Coquillet. This species does stand rather apart from other species of *Trichomyia* by virtue of its scaly wings and the more basal position of the medial fork. I do not consider that these differences are of generic rank ; within such genera as *Pericoma* and *Psychoda* species with all degrees of scaling are found, and I therefore propose to sink the genus with *Trichomyia* and the species with *cirrata* Coquillet.

(3) *Eubonetia* Vargas and Najera, 1953.

Vargas, L. and Najera, A. D., 1953, *Rev. Inst. Salubr. Enf. trop., Méx.* **13** : 153.

Vargas and Najera, noting that the species *Trichomyia cirrata* differed from other species of *Trichomyia* in both vestiture and venation, created a new genus *Eubonetia* to receive it. Subsequently (1953*b*) they ascribed a second new species to it, *E. maldonadoi*. *Eubonetia* was stated to differ from *Lepria* Enderlein by the presence of Sc in the wing. As Enderlein was mistaken about this character and as I have already argued that the species *cirrata* is not sufficiently unlike other species of *Trichomyia* to constitute a new genus, *Eubonetia* must be sunk as a synonym of *Trichomyia*. Should it, however, ultimately be decided that species like *T. cirrata*, *T. maldonadoi* and the species *T. eatoni*, described later in this paper, do warrant a subgeneric separation, then Enderlein's name *Lepria* would have priority. I am reluctant myself to split these three species off as a separate subgenus when new South American species are still being described, and when so much remains to be learnt about the subfamily.

Trichomyia urbica Haliday.

Haliday, 1839, *in* Curtis, *British Entomology* : 745.

The specimens used in this description are from the Eaton collection of Psychodidae in the British Museum.

A large species with the body covered with patches of brown and golden iridescent hair.

Male.—Head with a short decumbent vestiture of golden-brown hair. Antenna twice as long as wing width, scape scarcely longer than wide, flagellar segments pyriform as in fig. 1A with very long paired ascoids. Palpi 4-segmented, 1 and 2 partially fused as in fig. 1B, palpal sense organ on second segment only.

Thorax with centre covered with decumbent forwardly directed hairs of golden metallic hue shaped so as to follow the contour of the thorax ; sides with uprising tufts of brown hair. Wing with a golden vestiture crossed by two broad transverse fasciae of brown hairs,

one at the level of the basal cells and one at the level of the forks. Wing venation as in fig. 1C, the radial fork before the level of the tip of *M*4.

Hypopygium (fig. 1D) with coxite simple and undivided, twice as long as wide, style with a broad basal piece scarcely twice as long as wide, bearing a sclerotised distal process like a gloved-hand with the thumb held outwards ; the broader part of the process (the fingers) naked, the narrower part (the thumb) bearing some strong setae ; aedeagus simple,

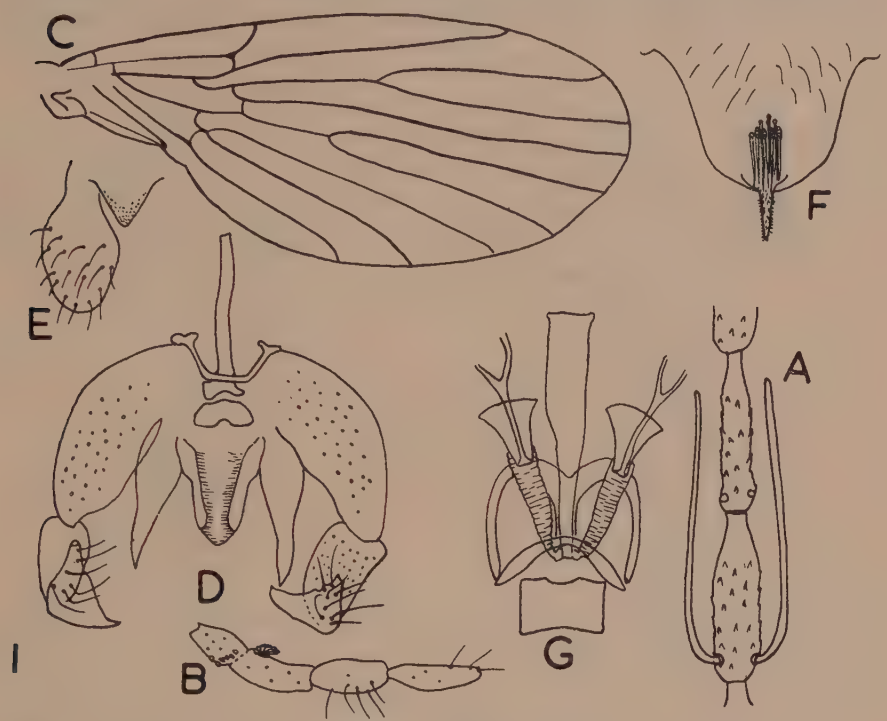


FIG. 1.—*Trichomyia urbica* Haliday. A, Flagellar segments. B, Palp. C, Wing. D, Hypopygium. E, Cercopod. F, Subgenital plate. G, Spermathecae.

single, symmetrical, flanked by simple pointed parameres united below aedeagus ; cercopod (fig. 1E) a simple oval lobe, anal valve an equilateral triangle.

Female.—Similar to male. Spermathecae as in fig. 1G ; subgenital plate as in fig. 1F.

Male, ENGLAND : Exeter, Devon, 9.vii.1891. (*A. E. Eaton*).

Female, ENGLAND : Holwell, Dorset, 27.vi.1904 (*A. E. Eaton*).

These specimens are in the British Museum. The location of Haliday's types, if they still exist, is unknown.

Trichomyia cirrata Coquillet, 1902.

Trichomyia cirrata Coquillet, 1902, *J. N. Y. ent. Soc.* **10** : 137.
Maruina cirrata Dyar, 1926, *Insec. Inscit. menst.* **14** : 111.
Lepria squamosa Enderlein, 1936, *Dtsch. ent. Z.* **1936** : 112.
Eubonetia cirrata Vargas and Najera, 1953, *Rev. Inst. Salubr. Enf. trop.* **13** : 153.

A metallic golden species with head, thorax and abdomen covered with shining scales.

Clypeus, frons and epicranium uniformly covered with golden scales. Antenna 1·6 times as long as wing width, scape scarcely longer than wide (fig. 2A), the flagellar segments fusiform, of approximately equal size, each bearing a pair of simple rod-like ascoids (fig. 2B).

Thorax much arched, the dorsum evenly covered with a smooth flat coat of overlapping golden scales, surrounded at the sides by upstanding tufts of yellow brown hair arising from the anepisternite. Wing (fig. 2E) 1·7 mm. long, 2·8 times as long as wide. *Cu* reaching as far as level of radial fork ; medial fork rather loosely connected and much closer to the

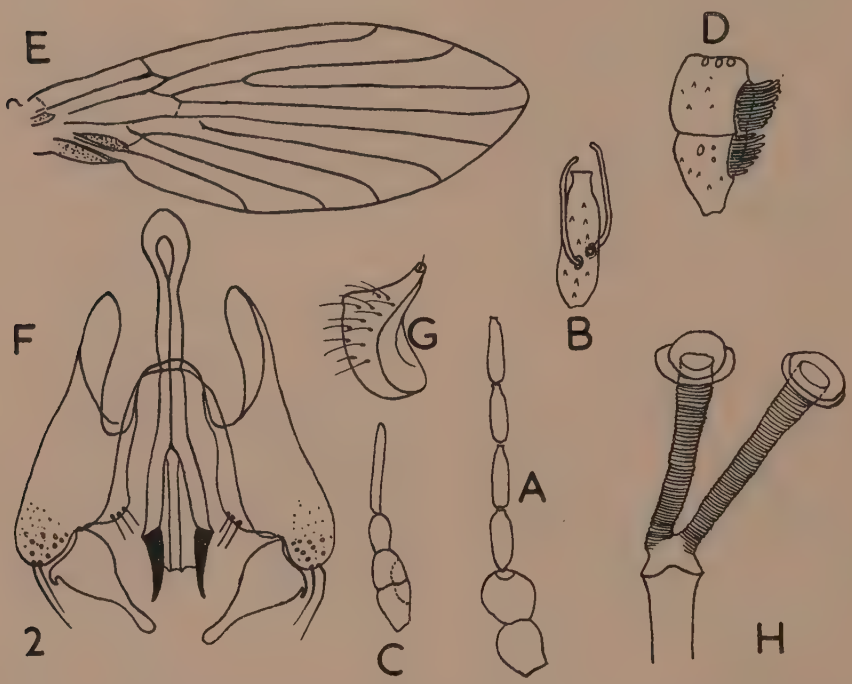


FIG. 2.—*Trichomyia cirrata* Coquillet. A, Antenna base. B, Flagellar segment. C, Palp, ♀. D, First two palpal segments, ♀. E, Wing. F, Hypopygium. G, Cercopod. H, Spermathecae.

apex of the basal cell than is usual in the genus. Vestiture of upper surface of wing consisting of golden scales over bases of veins, elsewhere of brown hair ; on under surface each vein carrying a double row of brown scales along its whole length. Legs unicolourous, covered with brown scales.

Abdomen with a smooth covering of imbricated brown scales. Hypopygium (fig. 2F) with coxite three times as long as wide, extended medially into a shelf-like prolongation; some long curved setae on its rounded lateral surface : style tennis-racquet shaped but rather more flattened at the end ; no deciduous or sensory setae on style ; aedeagus bifid, symmetrical, ending in two pointed pieces ; ninth tergite a simple broad band bearing the cercopods shaped as in fig. 2G.

Female.—Similar to male in details of vestiture. First two palpal segments closely approximated, recessed and bearing a cluster of sensory rods as in figs. 2C and 2D. Spermathecae very prominent, shaped as in fig. 2H.

Material examined : 1 ♂, 6 ♀, Brasil : Nova Teutonia, 6.ix.1936 and other dates (*Fritz Plaumann*). These specimens are in the British Museum.

Trichomyia edwardsi Tonnoir, 1929.

Tonnoir, A., 1929, *Dipt. Patagonia & S. Chile* **2** (1) : 30.

This South American species has been well described by Tonnoir from a single male. However, a female collected by Dr. and Mrs. Edwards on the same expedition, and evidently overlooked by Tonnoir, is now in the British Museum

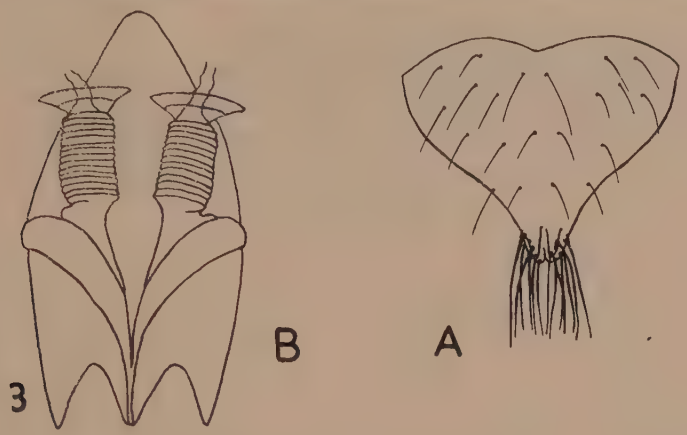


Fig. 3.—*Trichomyia edwardsi* Tonnoir. A, Subgenital plate. B, Spermathecae.

collection, and I am constituting this the allotype. The antenna is broken and the vestiture rubbed so that I can add little to the general description.

Female.—Maxillary palp 4-segmented, the first and second segments distinct though closely united ; sense organ reduced, consisting of a group of sensillae on segment 2, not sunk into a pit. Subgenital plate as in fig. 3A, triangular and divided at the tip ; spermathecae (fig. 3B) with short, wide, strongly annulated ducts.

Allotype, S. Chile : Case Pangue, Llanguihue prov., 4–10.xii.1926 (*F. and M. Edwards*). Types in the British Museum.

Trichomyia eatoni sp. n.

A small decorated species with the wings patterned with patches of black scales.

Female.—Scape and pedicel both subspherical ; scape with a medially facing tuft of black hairs, otherwise clothed with creamy-white scales ; flagellar segments shaped as in fig. 4A, the more terminal segments acquiring a distinct narrow apical neck, terminal segment with a small oval apiculus. Clypeus and frons with a vestiture of decumbent creamy-white scales. Palpi uninvestigated.

Thorax with dorsum evenly covered with a smooth flat coat of imbricated iridescent cream scales which all point forwards and lie so as to follow the contour of the body wall ; this central area of flat scales flanked laterally by uprising tufts of pale brown hair. Wing (fig. 4B) 1·4 mm. long, 2·5 times as long as wide, distinctly pointed just above *R*5 ; radial fork slightly after tip of *Cu* ; medial fork rather loosely connected, and much closer to wing base than is usual in the genus ; vestiture on both surfaces consisting mainly of long broad

scales ; creamy scales present on all veins in wing base up to commencement of disc ; black scales present along whole length of *Sc*, *R*1, *R*2, *R*3, *R*5 and *Cu*, at base middle and tip of *M*1, *M*2 and *M*4 and at the base and middle of *M*3 ; long hair in non-scaly areas creamy-white ; fringe hairy, pale brown, whitish round the apex ; legs with scaly iridescent covering.

Abdomen with a smooth flat vestiture of brown iridescent scales. Subgenital plate (fig. 4c) extended to form a circular lobe bearing some strong setae ; anal valve (fig. 4d) (between valves of ovipositor) pointed and hairy ; spermathecae as in fig. 4e.

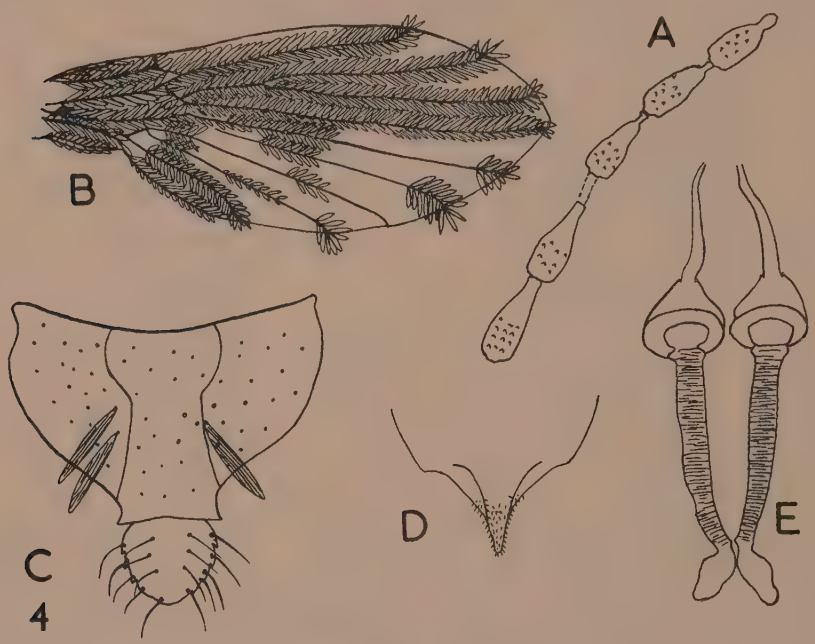


Fig. 4.—*Trichomyia eatoni* sp.n. A, Antenna. B, Wing, showing distribution of scales. C, Subgenital plate. D, Anal valve. E, Spermathecae.

The type consists of a whole female with the antenna and abdomen mounted separately as slides on the pin. The paratype female is a microscope slide of a wing and an antenna.

Type and paratype ♀, Jamaica : Moneague, 21.i.1905 (*Lord Walsingham*). Types in the British Museum.

Eaton had created a new genus in his MS. notes for this species, though he had not supplied a species name. Tonnoir had subsequently provided the species name *squamosa*, but I have abandoned this as Enderlein has already used it. In providing the name above I am commemorating the pioneer work on the Psychodidae of the Rev. A. E. Eaton. The species comes near to *T. cirrata* in the basal displacement of the medial fork, and in the scaly vestiture.

Trichomyia brasilensis sp. n.

A species superficially like *T. urbica* but with different genitalia.

Male.—Head and thoracic vestiture rubbed in type. Antenna apparently 13-segmented,

probably broken off ; scape and pedicel (fig. 5A) both a little longer than wide ; flagellar segments pyriform, the apical neck-like portion being more distinctly developed in the more distal segments ; ascoids, simple paired rods reaching to about one third of the way up the segment above. Palpi as in fig. 5B ; segments 1 and 2 closely approximated, recessed and carrying a bundle of sensory rods.

Thorax with a yellowish-brown integument. Wing 1·6 mm. long, venation (fig. 5C) very much as in *T. urbica* but forks farther out into the wing so that the radial fork is after the level of the tip of *M*4, not before it, as in the type species.

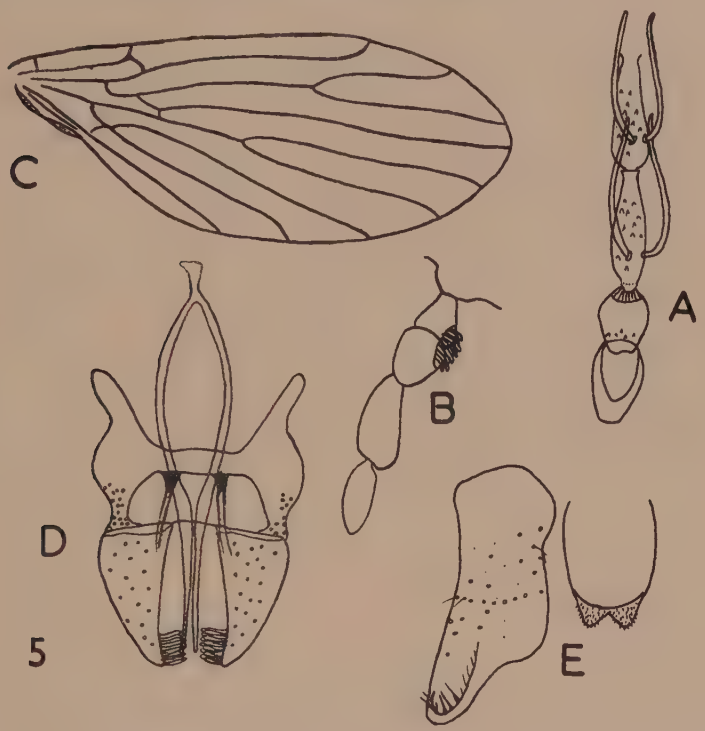


FIG. 5.—*Trichomyia brasilensis* sp.n. A, Base of antenna. B, Palp. C, Wing. D, Hypopygium. E, Cercopod and anal valve.

Hypopygium with coxites (fig. 5D) united by a transverse bridge bearing two pairs of setae set in prominent sclerotised bases ; style triangular, bearing at the apex, on its inner face, a bunch of retinacular-like structures ; aedeagus a pair of simple sclerotised processes like a pair of calipers ; cercopods as in fig. 5E, with a terminal semicircular ridge bearing some strong sclerotised points ; anal valve as in fig. 5E with paired triangular hairy lobes.

Type and ♂ paratype, BRAZIL: Nova Teutonia, 21.vii.1937 (*Fritz Plaumann*). The types are in the British Museum.

Trichomyia pedicillata sp. n.

The three specimens available have all been made into microscope slides so few details of the vestiture can be given.

Male.—Antenna broken, but flagellar segments with short necks, as in fig. 6A ; ascoids

rather curved, not extending on to next segment; Palpi (fig. 6B) with first and second segments completely fused; palpal sense organ in middle of compound segment.

Wing (fig. 6C) 1·4 mm. long, 2·5 times as long as broad, medial fork ending at a level beyond the tip of *Cu*; *M*3 and *M*4 united to form a very definite pedicel; vestiture apparently hairy.

Hypopygium complex. Ninth sternite produced into a median sclerotised pointed process (fig. 6D, st.); coxite longer than wide, bearing two strong hairs near its apex, style (fig. 6E) shaped like a flattened strip broadening out to a spatulate end, fringed with fine hairs; aedeagus flanked by strongly sclerotised pointed parameres (shown for one side only in fig. 6D, *p.*); aedeagus itself consisting of a short, dorsally directed piece (stippled in fig. 6D, *ae*); and two posteriorly directed pieces, one short and pointed, and the other longer and rounded at the tip; cercopod lobular as in fig. 6F.

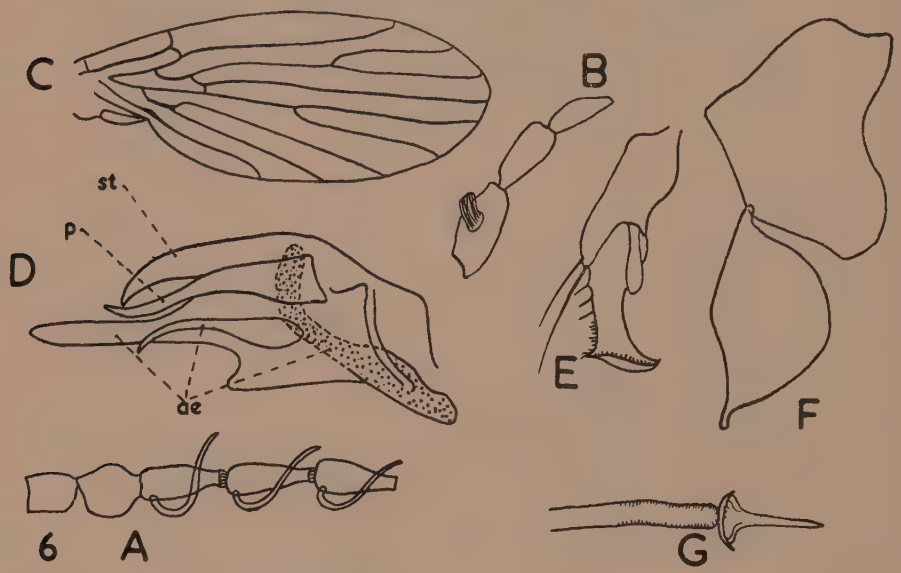


FIG. 6.—*Trichomyia pedicillata* sp.n. A, Base of antenna. B, Palp. C, Wing. D, Aedeagus (*ae*), parameres (*p*) and ninth sternite (*st*), in lateral view. E, Coxite and style. F, Cercopod and ninth tergite. G, Spermathecae.

Female.—Similar to male; valves of ovipositor elongate, not rounded as in other species; spermathecae as in fig. 6G.

Type, REPUBLIC OF PANAMA: Almirante, Bocas, 19.vi.1951 (*Quinones*). Allotype, 1 ♂ paratype, CANAL ZONE FOREST RESERVE: Cruces Trail, 10.viii.1951, in a tree hole (*M. Hertig*). Types in the British Museum.

Trichomyia congoensis sp. n.

A medium-sized uniformly brown species.

Antenna with scape subequal to pedicel; flagellar segments (fig. 7A) pyriform, the ascoids reaching half way up the next segment. Palpi 3-segmented, owing to complete fusion of the first two segments; sensory pit as in fig. 7B.

Wing as in fig. 7C; *R*5 at wing tip; *M*3 + *M*4 distinctly petiolated.

Hypopygium with coxite (fig. 7D) bifurcated, extended posteriorly on dorsal side as a bristle bearing process, and on medial side as a sclerotised paramere terminating in 10 or so spatulate digitiform processes ; style simple, pointed, curved ; aedeagus (fig. 7E) with a squarely ending apex ; cercopod (fig. 7F) lobular, with a thickened rod-like outer margin which is bent through a right-angle and articulated to the ninth tergite ; anal valve as in fig. 7F.

Type and only specimen, BELGIAN CONGO : N. Kivu, Kibati, xi–xii.1933 (*De Wulf*). The type is in the collections of the Musée Royal du Congo Belge, Tervuren, Belgium.

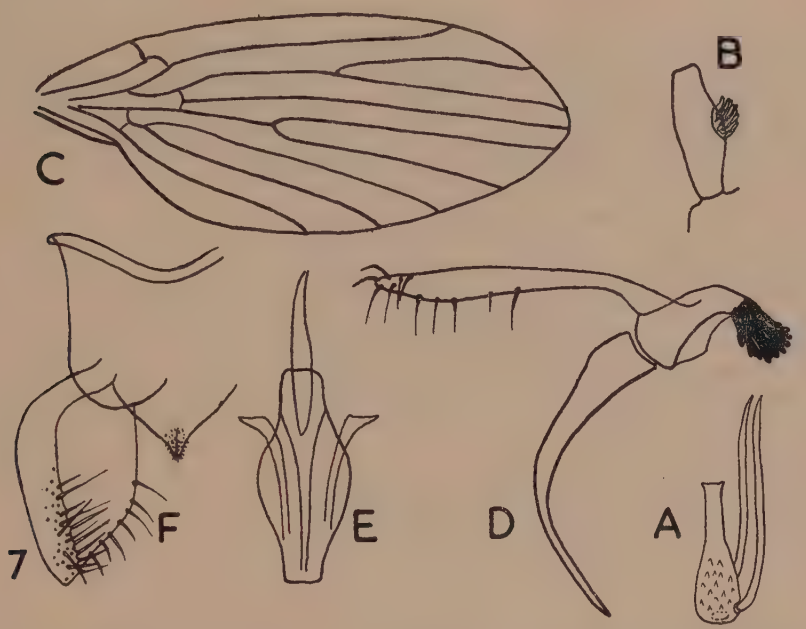


FIG. 7.—*Trichomyia congoensis* sp.n. A, Flagellar segment. B, First 2 palpal segments. C, Wing. D, Coxite and style. E, Aedeagus. F, Cercopod and ninth tergite.

Check list of species of the genus *Trichomyia*.

T. brasilensis sp. n.
T. brevicornis (Loew), 1850.
T. buceras (Loew), 1845.
T. cirrata Coquillet, 1902.
T. concinna Meunier, 1905.
T. congoensis sp. n.
T. crassicornis Meunier, 1905.
T. decora Meunier, 1905.
T. distincta Meunier, 1905.
T. eatoni sp. n.
T. edwardsi Tonnoir, 1929.
T. fairchildi Vargas and Najera, 1953.
T. formulosa Meunier, 1905.
T. fusca Satchell, 1950.
T. hawaiiensis Quate, 1954.
T. longicornis (Loew), 1850.
T. maldonadoi Vargas and Najera, 1953.
T. nova Meunier, 1905.
T. nuda (Dyar), 1926.
T. oahuensis Quate, 1954.
T. pedicillata sp. n.
T. piricornis Freeman, 1949.
T. procera Meunier, 1905.
T. pulchra Meunier, 1905.
T. sequoiae Quate, 1955.
T. swinhoei Cockerell, 1917.
T. tenera Meunier, 1905.
T. urbica Haliday, 1839.
T. wirthi Quate, 1955.

Summary.

The genus *Trichomyia* Haliday is redefined, and the three genera *Diplonema* Loew, 1845, *Lepria* Enderlein, 1936 and *Eubonetia* Vargas and Najera, 1953 are sunk as synonyms of it. Four new species, *T. eatoni* (Jamaica), *T. pedicillata* (Panama), *T. brasilensis* (Brazil) and *T. congoensis* (Belgian Congo) are described, as is also the female of *T. edwardsi* Tonnoir (Argentine). The type species, *T. urbica* Haliday, is redescribed, as also is *T. cirrata* Coquillet. A check list is given.

Acknowledgments.

I should like to express my indebtedness to Dr. Gordon Fairchild of Panama for much helpful discussion, the loan of a transcript of Loew's 1850 paper and the gift of the specimens of *T. pedicillata* ; to Mr. Paul Freeman for much help and encouragement during my stay at the British Museum, and to Mr. P. L. G. Benoit for the loan of material from the Musée Royal du Congo Belge.

References.

Cockerell, T. D. A., 1917, *Ann. ent. Soc. Amer.* **10** : 21.
Coquillet, D. W., 1902, *J.N.Y. ent. Soc.* **10** : 137.
Dyar, H. G., 1926, *Insec. Inscit. menst.* **14** : 111.
Haliday, A., 1839, *in* Curtis, *British Entomology* : 745.
Enderlein, G., 1936, *Dtsch. ent. Z.* **1936** : 112.
Freeman, P., 1949, *Proc. R. ent. Soc. Lond.* (B) **18** : 238.
Loew, H., 1845, *Dipterologische Beitrage* **1** : 7.
——, 1850, *Progr. Meseritz.* : 31.
Meunier, F., 1905, *Ann. hist. nat. Mus. hung.* **3** : 246–51.
Quate, L., 1954, *Proc. Hawaii. ent. Soc.* **15** : 337.
——, 1955, *Univ. Calif. Publ. Ent.* **10** : 103–273.
Satchell, G. H., 1950, *Trans. R. ent. Soc. Lond.* **101** : 148.
Tonnoir, A. L., 1929, *Dipt. Patagonia and S. Chile* **2** (1) : 30. Brit. Mus. (Nat. Hist.)
Vargas, L. and Najera, A. D., 1953*a*, *Rev. Inst. Salubr. Enf. trop., Méx.* **13** : 153–8.
——, 1953*b*, *ibid.* **13** : 128–30.

A NEW GENUS OF AFRICAN MEGASTIGMINAE (HYMENOPTERA : CHALCIDOIDEA).

By N. W. Hussey.

(*Dept. of Agricultural and Forest Zoology, University of Edinburgh.*)*

Knowledge of the African Megastigminae is scanty as a long series of the group has not hitherto been studied. *Megastigmus somaliensis* Hussey has recently been described (1956) from specimens reared from seeds of *Juniperus procera* Hochstetter in British Somaliland, Abyssinia and Kenya, and *M. aculeatus* Swederus is known from seeds of *Rosa* spp. in French Somaliland (Milliron, 1949). *M. suspectus* var. *pinsapinis* Hoffmeyer, which Berland (1950) bred from seeds of *Cedrus atlantica* Marelli in the South of France, probably occurs in the native home of this host in the Atlas Mountains of Algeria and Morocco.

Through the kindness of the Trustees of the British Museum (Natural History) and the Director of the Commonwealth Institute of Entomology I have been able to examine some 200 specimens from various parts of Africa. The majority of these specimens were captured without reference to host so that it has often been impossible to decide which of the sexes were co-specific. The following descriptions are based on species submitted to the Commonwealth Institute of Entomology for identification and for which the host has been positively identified.

I acknowledge with thanks the helpful criticisms of Mr. R. D. Eady and Mr. G. J. Kerrich of the Commonwealth Institute of Entomology and am grateful to Mr. E. O. Pearson for information on Afrikaans local names.

Eumegastigmus gen. n.

Milliron (1949 : 264) has defined a combination of characters by which *Megastigmus* may be separated from other genera in the subfamily. He was, however, only able to use the very inadequate descriptions by Girault for *Bootanomyia*, *Paramegastigmus*, *Epimegastigmus*, *Neomegastigmus*, and *Epibootania*. During the present study Mr. Riek, of the Australian Scientific Service, Canberra, who is working on a revision of the Australian Megastigminae, discussed the material and was kind enough to give me his provisional key to these genera and *Pulvilligera* Milliron.

Eumegastigmus resembles, in general form, the relatively long and thin *Paramegastigmus* from which it is distinguished by the fact that the axillae do not touch. According to Riek's provisional key, *Eumegastigmus* would be very close to the Australian *Megastigmus* and *Neomegastigmus* but it may be separated from both of these genera by the elongate thorax. The ratio of thoracic length (measured from the front of the mesopraescutum to the posterior margin of the scutellum) to breadth varies between 1·7–2·1 in *Eumegastigmus* but only 1·3–1·5 in *Megastigmus*. Other characteristics include the scarcely emarginate anterior flange of the pronotum and the fact that the length of the antennal scape is equal to the combined lengths of the pedicel, ring-joint and first two funicle segments. There

* Now at *Glasshouse Crops Research Institute, Littlehampton, Sussex.*

are a pair of scutellar hairs posterior to the transverse line which, in some species, is so faint as to be detectable only by a change in surface sculpture. The male genitalia are of the form figured for *M. cupressi* by Mathur (1955), but the claspers have only three teeth.

Type species: *Eumegastigmus hypogea* sp. n. from Nairobi, Kenya.

It is interesting to observe that the hosts from which this new genus has been recorded are members of the Compositae and Anacardiaceae which, according to Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew, have a relatively high resin content. This suggests that *Eumegastigmus* is more closely related to the predominantly conifer infesting *Megastigmus* than to the Australian members of the sub-family which are largely parasitic.

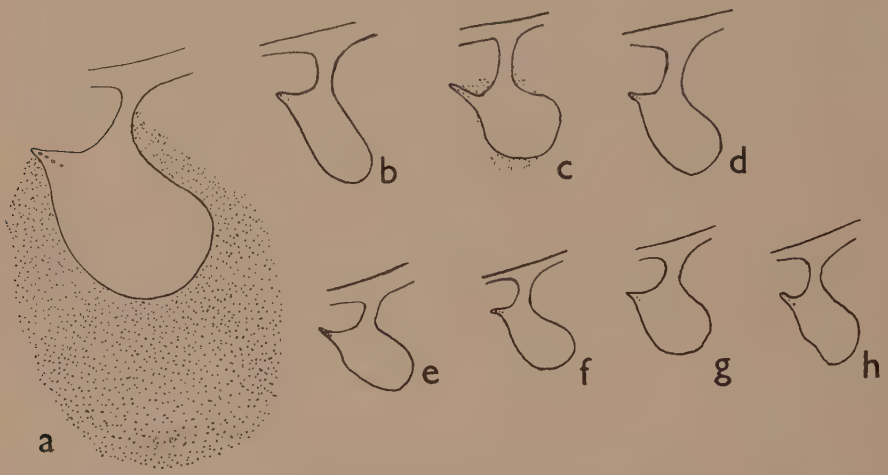


Fig. 1.—Stigma of (*a*) *Eumegastigmus hypogea* sp. n., ♂; (*b*) ditto, ♀; (*c*) *E. thomseni* sp. n., ♂; (*d*) ditto ♀; (*e*) *E. rhusi* sp. n., ♂; (*f*) ditto ♀; (*g*) *E. transvaalensis* sp. n. ♂, (*h*) ditto ♀. (All to same scale.)

Eumegastigmus hypogea sp. n.

Female.

Length (mm.): Body 4·6; abdomen 1·7; ovipositor 1·9.

Vertex of head weakly convex with well defined transverse rugae; genal area with oblique rugae; occipital carina regularly rounded; posterior ocellar line 1·7 times ocell-occipital, ocellocular and lateral ocellar lines; malar space one-third height of compound eye; hairs on head sparse, stout and black but mostly pale on lower face. Pronotum with strong transverse rugae coarser than those on vertex, anterior flange well developed but weakly emarginate; mesopraescutum with coarse irregular transverse rugae posteriorly but finer anteriorly with a tendency to shagreening; parapsides with irregular transverse rugae often almost as coarse as on posterior part of mesopraescutum, especially near the notaulices; axillae finely obliquely rugose; scutellum basally truncate with two rows of 3–4 scutellar hairs, shagreened anterior to the fine transverse line and with fine oblique rugae behind; propodeum with a variably developed central depression towards hind margin and with coarse lateral rugae showing a tendency to be arranged in concentric circles, interstitial rugosity fine. Abdomen scarcely compressed laterally; ovipositor normally upcurved from the base.

Nine to eleven bristles on basal abscissa of the sub-marginal vein of the fore wing; stigma as in fig. 1*b*.

Colour : Generally yellow and black. Head yellow excepting genal suture, antennal scrobes and an area, including the ocelli, extending back to the occiput, which are black. Pronotum bright yellow, excepting medial dorsal black band which is narrower posteriorly ; mesopraescutum yellow-brown with a dark medial dorsal band which is triangularly broadened anteriorly and extends on to the scutellum posteriorly ; parapsides and axillae yellow-brown ; scutellum with brown anterior central spot and longitudinal infuscation extending posteriorly ; metanotum yellow ; propodeum black medially with a narrow black line below meta-epimeron. All thoracic sutures black. Abdomen shining dark brown above, excluding segment 8 which is yellow-brown, paler below, tergites 4–7 with lateral paler areas extending up from below. Ovipositor valves black.

Male.

Length (mm.) : 5·0.

Sculpture as in female but propodeum with lateral carinae as in fig. 2. Twelve submarginal bristles on fore wing, stigma as in fig. 1*a*. *Colour :* Yellow and black but proportions vary considerably. Head with face black and only clypeus and genal areas yellow ; vertex yellow with a black patch around the ocelli ; scrobes black, antennae brown above, yellow below. Prothorax yellow with central dorsal black longitudinal band widening posteriorly and with lateral areas black ; mesopraescutum with longitudinal, dorsal band black ; parapsides yellow-brown but black ventro-laterally ; axillae similar ; scutellum with central longitudinal black band wider behind the transverse line ; metanotum yellow, propodeum entirely black. Legs with all coxae black, femora entirely yellow or almost entirely dark brown, rest of legs yellow. Abdominal segments 3–8 black, rest yellow apically, on tergites 6 and 7 the yellow bands are interrupted with black.

A very variable species in which some specimens show the following characters:

Female.—Depression formed by carinae on propodeum may be long and narrow or almost absent. Band on dorsal surface of pronotum almost absent or only red-brown. Mesopraescutum, outer angles of parapsides, axillae and scutellum can be entirely reddish-brown ; lateral black line on meta-epimeron sometimes absent.

Male.—Head may be entirely yellow or the vertex black with only narrow bands around the compound eyes. Propodeum with black restricted to central triangular patch, broadest posteriorly, and along spiracular groove. Infuscation around stigma of fore wing very variable. Coxae may sometimes be yellow apically. Abdominal segments brown-black with segments 4–8 yellow laterally and the dark brown apical bands becoming lighter below.

Kenya : Nairobi, v.1937, bred from " Oil Seed ", probably *Helianthus* sp. (Compositae).

Holotype ♀, allotype ♂, 3 ♀, 1 ♂ paratypes, in the British Museum (Natural History). 1 ♀ and 1 ♂ paratypes in author's collection.

Eumegastigmus thomseni sp. n.

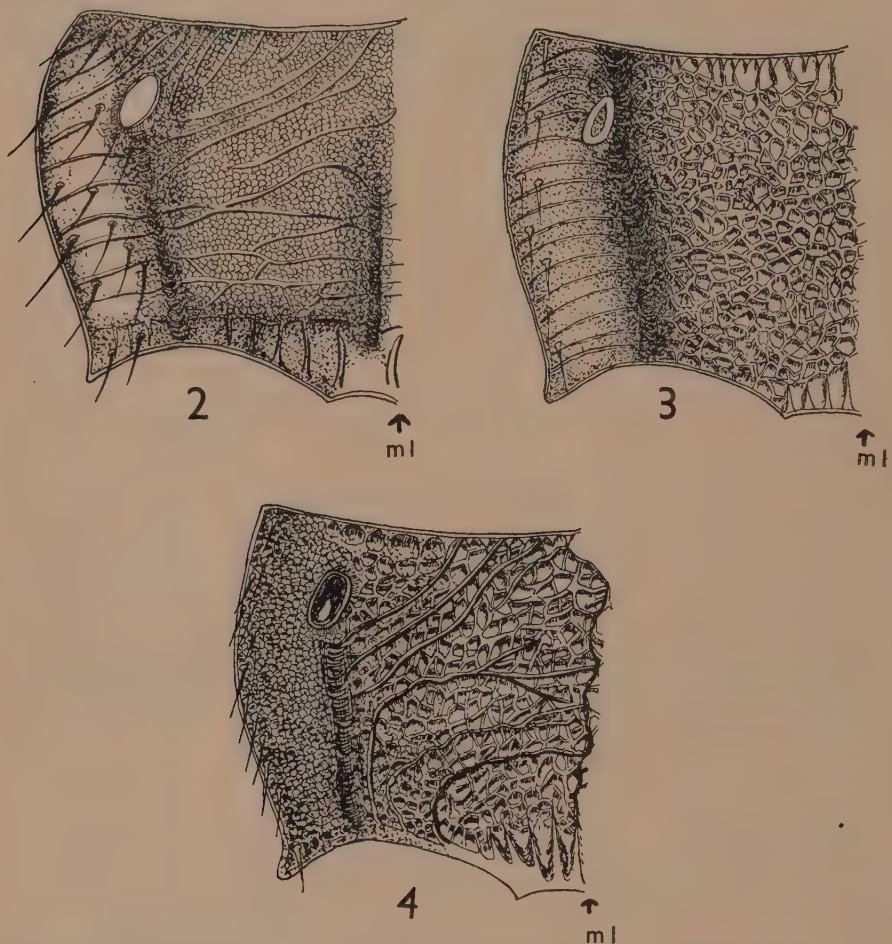
Female.

Length (mm.) : Body 3·2–5·0 ; abdomen 1·2–1·5 ; ovipositor 1·5–1·7.

Vertex weakly convex with transverse rugae circularly oblique before ocelli ; genal area with fine oblique rugae ; occipital carina sharp, evenly rounded ; hairs on head sparse, dark and coarse but on face and cheeks pale, denser, and becoming longer towards mouth ; posterior ocellar line 1·7 times ocellocular and lateral ocellar lines and 1·4 times ocelloccipital line ; malar space half height of compound eye. Pronotum with transverse rugae coarser than those on vertex, anterior flange strongly developed but weakly emarginate ; mesopraescutum and parapsides transversely rugose (as on vertex) but finer anteriorly especially on mesopraescutum ; axillae finely obliquely rugose and almost contiguous before the scutellum which is rounded anteriorly ; scutellum finely transversely shagreened

anterior to the ill-defined transverse line, similarly but longitudinally shagreened behind ; scutellar hairs 3–4 ; propodeum irregularly and coarsely rugose with lateral transverse carinae similar to *E. hypogea* (fig. 2), spiracular groove well defined. Abdomen laterally compressed, ovipositor very sharply upturned from base.

Ten to twelve bristles on basal abscissa of sub-marginal vein of fore wing ; stigma as in fig. 1*d*.



Figs. 2–4.—Propodeum of (2) *Eumegastigmus hypogea* sp. n. ♂ ; (3) *E. rhusi* sp. n. ♀ ; (4) *E. transvaalensis* sp. n. ♀.

Colour : Yellow-brown. Face yellow ; area around ocelli, central portions of mesopraescutum, scutellum and anterior angles of parapsides darker yellow-brown ; propodeum black mid-dorsally. Abdominal tergites 3–7 yellow-brown to black above, paler below, apical segments paler yellow-brown. In some specimens the epimeral groove on propodeum is black.

Male.

Length (mm.) : 3·5–4·0.

Ten to eleven bristles on basal abscissa of submarginal vein of fore wing ; stigma as fig. 1*c*.

Surface sculpture as in female.

Colour : Yellow-brown excepting darker diamond-shaped patch on scutellum and black triangular area on propodeum. Abdomen dark brown to blackish dorsally, on segments 3–8 yellow-brown gradually extending further up the posterior edge of successive segments, apical segments yellow-brown.

Transvaal Province : Wolhuitensenskop, 12.i.20, from seeds of " Witharpuisbos " (*F. Thomsen*). The proper name of this host cannot be determined, but Mr. Pearson, of the Commonwealth Institute of Entomology, has suggested that it is possibly related to the so-called resin-bush *Heeria insignis* (Del) O. Ktze. (Anacardiaceae).

Holotype ♀, allotype ♂ and 3 ♀ paratypes in British Museum (Natural History). 1 ♀ and 1 ♂ paratypes in the author's collection.

Eumegastigmus rhusi sp. n.

Female.

Length (mm.) : Body 2·4–2·7 ; abdomen 1·1 ; ovipositor 1·4.

Description as for *E. thomseni* excepting :

Head almost quadrate (ratio width/length of vertex 1·8 in *rhusi* but 3·5 in *thomseni*) ; posterior ocellar line twice ocellocular and lateral ocellar lines ; malar space one-third height of compound eye. Due to smaller size the surface sculpture appears finer than *thomseni*. Mesopraescutum and parapsides more uniformly transversely rugose, finer than rugae on pronotum ; scutellar hairs 3 ; propodeum with lateral transverse rugae absent and sculpture finer (fig. 3).

Nine to ten bristles on basal abscissa of sub-marginal vein of fore wing ; stigma as in fig. 1*f*.

Colour.—As *thomseni* but no black on spiracular groove and epimeron. Sometimes a black area around posterior ocelli.

Male.

Length (mm.) : 2·0–2·2.

Sculpture as in female. Stigma of fore wing as fig. 1*e*.

Nine to ten bristles on basal abscissa of sub-marginal vein of fore wing.

Colour.—As *thomseni* but propodeum with a dorsal triangular black area. Abdomen dark brown dorsally and yellow-brown below.

Orange Free State : Bloemfontein 18.xii.1924, from seeds of *Rhus lancea* L. (Anacardiaceae). Labelled South Africa AcP3291 For. Dep. Div. Ent. Pretoria.

Holotype ♀, allotype ♂, and 2 ♀ and 3 ♂ paratypes in British Museum (Natural History). 1 ♀ and 1 ♂ paratype in author's collection.

Eumegastigmus transvaalensis sp. n.

Female.

Length (mm.) : Body 3·1–3·4 ; abdomen 1·2–1·4 ; ovipositor 1·5–1·9.

Description as for *E. thomseni* excepting :

Occipital carina relatively weak, ratio length/breadth of vertex 3·0. Anterior portion of scutellum finely punctate and propodeal sculpture more coarse (fig. 4) ; scutellar hairs 3.

Nine to ten bristles on basal abscissa of sub-marginal vein of fore wing ; stigma as in fig. 1*h*.

Colour : Pale yellow-brown. Dark brown areas around ocelli ; head brownish above, paler below ; face yellowish. Pronotum yellow with medial and lateral brown patches ; central dorsal triangular area on mesopraescutum dark brown ; scutellum same colour medially and behind, yellow anterio-laterally ; dark brown to black medial triangular patch on propodeum.

Male.

Length (mm.) : 2·3–2·9.

Propodeal sculpture as female but finer ; scutellar hairs 3.

Nine to eleven bristles on basal abscissa of submarginal vein of fore wing ; stigma as in fig. 1*g*.

Holotype ♀, 8 ♂ paratypes, Transvaal : Pretoria, 9.v.1919, from seeds of *Schinus molle* L. (Anacardiaceae) (*F. Tooke*). Labelled South Africa AcP2175. Also 5 ♀, labelled South Africa AcP2057, from

Transvaal : Rustenburg, 25.x.1919.

Types and paratypes in British Museum (Natural History). 1 ♀ and 1 ♂ in author's collection.

Key to species of *Eumegastigmus*.

Females.

1		Large species, body length about 5 mm.	2
		Small species, body length about 2·5 mm.	3
2	(1)	Head with ocelli surrounded with black ; thoracic dorsum with longitudinal black stripe	**hypogea**
		Uniformly yellow-brown	**thomseni**
3	(1)	Propodeum with oblique carinae (fig. 4)	**transvaalensis**
		Propodeum uniformly finely punctate (fig. 3)	**rhusi**

Males.

E. hypogea and *E. thomseni* separated as for females above.

3	(1)	Propodeum uniformly punctate	**rhusi**
		Propodeum with two irregular dorsal longitudinal and faint oblique carinae	**transvaalensis**

References.

Berland, L., 1950, Un Chalcidien phytophage *Megastigmus suspectus* var. *pinsapinis* Hoff. *Entomologiste* **6** : 56–57.

Hussey, N. W., 1956, A new species of *Megastigmus* Dalman (Hym : Chalcidoidea) from British Somaliland. *Bull. ent. Res.* **47** : 57–59.

Mathur, R. N., 1955, A new species of *Megastigmus* Dalman (Hym : Chalcidoidea) from seeds of *Cupressus torulosa* Don. *Proc. R. ent. Soc. Lond.* (B) **24** : 91–94.

Milliron, H. E., 1949, Taxonomic and biological investigations in the genus *Megastigmus*, with particular reference to the taxonomy of the Nearctic species (Hym : Chalcidoidea : Callimomidae). *Amer. midl. Nat.* **41** : 257–420.

A REVISION OF THE SPECIES OF *DIXA* (DIPTERA: CULICIDAE) FROM AFRICA SOUTH OF THE SAHARA.

By Paul Freeman.

(*British Museum, Natural History.*)

The British Museum collection now contains specimens of all the species of *Dixa* which have been described from Africa south of the Sahara (Ethiopian Zoogeographical Region), making it possible to prepare a revision of the group.

I should like to record my thanks and appreciation for their help to the following: Dr. P. L. G. Benoit, Musée Royal du Congo Belge for exchanging paratypes of his species and for lending me the type of *D. katangae*; Dr. A. J. Hesse, South African Museum, for the trouble he took in trying to trace the type series of Wood's two species and for lending me such material as was in the Museum; Dr. K. M. F. Scott, Cape Town University, Mr. A. D. Harrison, Witwatersrand University and Dr. B. R. Stuckenberg, Natal Museum for sending me material of four species from South Africa.

The subfamily Dixinae of the Culicidae, or the family Dixidae as some authors prefer to regard it, contained only the single genus *Dixa* until 1924, when Tonnoir erected a second genus for a New Zealand species. In the same year Dyar and Shannon proposed two new subgenera for two American species and, again in the same year, Garrett and Tonnoir showed independently that the species of *Dixa* could be divided into two groups on adult and larval characters. Edwards (1932) has redefined and given keys to genera and subgenera. Only the subgenera *Dixa sensu stricto* and *Paradixa* Tonnoir are recorded from Africa south of the Sahara and they may be separated by the following definitions:

Subgenus *Dixa* Meigen *sensu stricto*: first few antennal segments quite distinct, basal flagellar segment (fig. 1, *d*) somewhat fusiform; media usually with macrotrichia nearly to base; male hypopygium with lobe at apex of coxite short or absent (figs. 2, *a–e*), aedeagus simple. Abdomen of larva with dorsal crown or rosette of stiff hairs on each of segments 2–7 or 3–7.

Subgenus *Paradixa* Tonnoir: first few antennal flagellar segments indistinct, first one quite cylindrical (fig. 1, *e*) and longer in proportion than in subgen. *Dixa*; media rarely setose for more than its apical half; male coxite with long process at apex, usually at least half as long as coxite, often same length (fig. 2, *f*); aedeagus complex. Abdomen of larva lacking dorsal crowns on abdominal segments.

Tonnoir (1924) gave as additional characters for the New Zealand species that r–m was before the fork of Rs in *Dixa* and either at the fork or beyond it in *Paradixa*. This character does not apply either to the Palaearctic or to the African species: in all the African species known to me r–m is either at the fork of Rs or beyond it, whereas antennal and genitalic characters indicate that only one species is correctly to be placed in *Paradixa*.

Of the eight species of the genus *Dixa* which have been described from Africa south of the Sahara, five were placed by their authors in *Paradixa*: all of these should be placed in *Dixa sensu stricto*, the single African species of *Paradixa* known to me being new to science. Although I have been able to examine type

material of only five species and material collected by the author of a sixth, I have been able to recognise the other two from their descriptions.

The species of *Dixa* are mostly variable in colour and wing venation and the African species are no exception to this. On structural characters it is possible to recognise six groups within which there is some colour variation, specimens from different localities tending to show different colour forms. It seems fairly certain that these groups are species, so that the total number of species is reduced from eight to six, including one new one.

Key to species of genus *Dixa* from Africa south of the Sahara.

1 Antenna with basal flagellar segment at least slightly fusiform (fig. 1*d*) ; male coxites without long process at apex ; frons and vertex uniformly brown . . . . . (**Dixa** *sensu stricto*) 2

Basal flagellar segment cylindrical (fig. 1, *e*), longer in proportion than in subgenus *Dixa* ; male coxites with long curved process at apex (fig. 2, *f*) ; head with broad central yellow band **D.** (**Paradixa**) **harrisoni** sp. n.

2 Thorax pale, mesonotal stripes may be brown and separate or they may be reduced to a dark spot above each wing base ; male styles elongate and narrow (fig. 2, *a*), wings broader than in other species, line of cross-veins more transverse, Rs shorter (fig. 1, *a*) **camerounensis** Alexander

Thorax darker, stripes always dark brown, often fused, styles and wings not like this 3

3 Thorax with three pairs of dull black spots: one pair at front, another pair at front of lateral stripes, third pair on pleura below wings ; male styles as in fig. 2, *b* . . . . . **lunata** Edwards

Thorax without dull spots, styles different 4

4 Head and thorax dull or only slightly shining and with well developed pruinosity, pleura dark, with or without two pale stripes ; male coxites with large thumb-like process at apex, styles turned in at apex (fig. 2, *c*) . . . . . **claripennis** Séguy

Head and thorax shining, pruinosity reduced or absent, male hypopygium different 5

5 Pleura yellow with a broad central brown stripe, male styles broader (fig. 2, *d*) . . . . . **bicolor** Wood

Pleura dark brown, paler around wing bases and along upper margin, male styles narrow (fig. 2, *e*) . . . . . **capensis** Wood

Dixa (*Dixa*) *camerounensis* Alexander.

Dixa (*Paradixa*) *camerounensis* Alexander, 1926, *Insect. Inscit. menstr.* **14** : 11 ; Alexander, 1928, *Rev. Zool.-Bot. Afr.* **16** : 27 ; Edwards, 1929, *Entomologist* **62** : 160.

Dixa katangae Alexander, 1928, *Rev. Zool.-Bot. Afr.* **16** : 27 (**syn. nov.**) ; Edwards, 1929, *Entomologist* **62** : 160.

Dixa varipes Edwards, 1934, *Ann. Mag. nat. Hist.* (10) **14** : 325 (**syn. nov.**).

Thorax with yellow background, mesonotal stripes variable, either hardly darker or else brownish or reduced to a rounded brown spot above wing base ; posterior tibiae usually more slender than in other species and apical bulb rather wider in proportion ; male styles narrow, curved and almost bare, Rs shorter than in other species.

This species is easily distinguished from all others by the male genitalic characters ; it shows some colour variation but is always much paler than other species and often has dark knees. The synonyms listed above were described from different colour forms. I have examined paratypes of *camerounensis* and the holotypes of *katangae* and *varipes*.

♂♀. Wing length 3–4 mm.

Head yellowish-brown, mouthparts darker, antennae with segments of normal form for the subgenus, hairs short in the male. *Thorax* with yellowish ground colour; mesonotal stripes sometimes hardly indicated, in other specimens well marked and brown with the central one divided; in *katangae*-like specimens the mesonotum is yellowish and with a rounded brown spot above the wing base, this position is often darker in other specimens. Scutellum yellowish, with some or all (*varipes*) of the stripes continued across it; postnotum yellowish-brown; pleura yellowish and with two darker stripes, quite narrow in pale specimens but broader in dark ones. *Legs* yellowish-brown, knees usually, though not always, blackened; femora may be black tipped and with a pale ring below the tip; basal parts of the femora may be dark. Posterior tibia narrow and rather more suddenly enlarged at apex than in other species. *Wings* (fig. 1, *a*) broader than in other species; in type series with

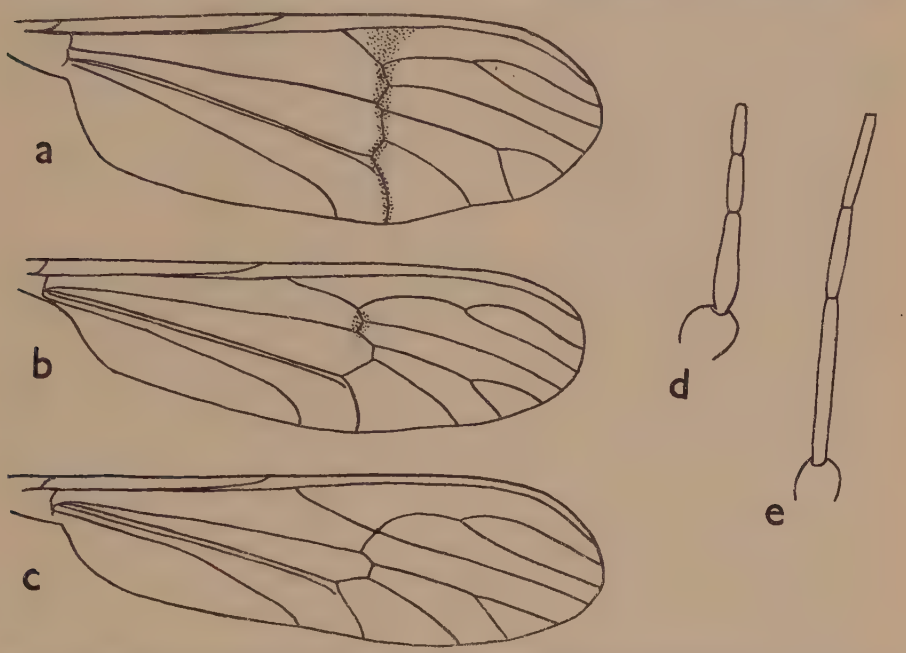


Fig. 1.—Wings and antennae of *Dixa*. (*a*) *D. camerounensis* (female paratype); (*b*) *D. lunata*; (*c*) *D. harrisoni*; (*d*) base of antenna of female *D. lunata*; (*e*) the same of *D. harrisoni* drawn to same magnification.

a narrow dark band occupying cross veins and Cu; though often paler, this band can be traced in most specimens; cross-vein r–m distal to fork of Rs, exact proportions of veins variable, but Rs seems constantly shorter and line of cross veins more transverse than in other species. Halteres yellowish-brown.

Abdomen brown. Male hypopygium with simple aedeagus; style and coxite (fig. 2, *a*) quite characteristic; style long and curved and almost bare, lacking long hairs; coxite with apical lobe thumb-like and with a fringe of stout hairs, basal lobe more elongate than in other species, rather variable in shape.

Holotype of *camerounensis* in Professor C. P. Alexander's private collection, paratypes in British Museum (Nat. Hist.); of *katangae* in Musée Royal du Congo Belge; of *varipes* in British Museum (Nat. Hist.).

Distribution.—French Equatorial Africa: Cameroun, Muami, 1000 ft.,

viii.1923, type locality of *camerounensis* (*J. A. Reis*). São Thomé : x.1932, holotype male of *varipes* (*W. H. T. Tams*). Belgian Congo : Ht. Katanga, Lubumbashi, vi.1920, holotype female (not male as stated in original description) of *katangae*. Uganda : Kampala, 2 ♂, vii.1926 (*G. L. R. Hancock*) ; Butandija, 2 ♂, i.1930 (*H. Hargreaves*) ; Ruwenzori Range, Kilembe, 4500 ft., 2 ♂, and Namwamba Valley, 6500 ft., 1 ♂, xii.1934–i.1935 (*F. W. Edwards*). N. Rhodesia : Congo Border, Tshinsenda, 1 ♀, v.1928 (*H. S. Evans*).

Dixa (*Dixa*) *lunata* Edwards.

Dixa lunata Edwards, 1929, *Entomologist* **62** : 160; Mattingly, 1954, *Arch. Hydrobiol.* **48** : 447. *Dixa* (*Paradixa*) *lipsi* Benoit, 1953, *Rev. Zool.-Bot. Afr.* **48** : 202 **(syn. nov.)**.

Colour variable, but darker than *camerounensis*, thorax always with three pairs of dark rounded spots—on shoulders, in front of and below wings ; antennae of male with long hairs ; posterior tibial bulb not as strongly swollen as in *camerounensis* ; style of male flattened and tuncate at tip.

Easily recognised by the black thoracic markings which can always be seen even in the darkest specimens ; the male hypopygium is also characteristic and the male antennae carry longer hair than usual so that they may appear subplumose. I have examined the holotypes of *lunata* and *lipsi*.

♂♀. Wing length 2·75–3·5 mm.

Head dark, face paler, antennae of normal form for subgenus, but in male hairs are longer than is usual, those on flagellar segments 2–3 being about as long as the segments. *Thorax* variable in colour, more or less shining, mesonotal stripes brown, background often ochreous ; three pairs of dull black spots always present : one pair on shoulders at each side of the median stripe, another pair behind these on the lateral margins at the front end of the lateral stripes which may appear crescent-shaped, the third pair is on the pleura and occupies most of the mesepimeron. Scutellum usually ochreous, postnotum brown, pleura with brown stripe, yellow below and above. *Legs* fairly uniformly brownish-yellow, posterior tibia not as narrow as *camerounensis* and without such a pronounced apical bulb. *Wings* (fig. 1, *b*) narrower than in *camerounensis*, cross-vein r–m slightly clouded in most specimens, clouding sometimes extending back across wing ; venation fairly normal, r–m distal to fork of Rs. Halteres brownish. *Abdomen* brown ; male hypopygium with simple aedeagus ; coxites (fig. 2, *b*) simple, apical lobe hardly developed, basal lobe broad, style slightly flattened, rather truncate at apex and with inner point.

Holotype of *lunata* in British Museum (Nat. Hist.) ; of *lipsi* in Musée Royal du Congo Belge.

Distribution.—Nyasaland : S. Rukura River, vi.1910, holotype male and 1 ♂ paratype of *lunata* (*S. A. Neave*). Belgian Congo : Katanga, Kisanga, nr. Elisabethville, ii.1953, holotype male and series of paratypes of *lipsi* (*M. Lips*) ; Kwango Prov., Bunda, Kifulu, 2 ♂, 3 ♀, ix.1937 (*Mortiaux*) ; Kwango Prov., R. Kibubu, 2 ♀, 1937 (*Noel*) ; Kwango Prov., Kalunga, 1 ♂, v.1938 (*A. Duren*) ; Kwango Prov., Mabaka, 1 ♀, v.1938 (*A. Duren*) ; Kasaka R., nr. Elisabethville, 1 ♀, v.1952 (*M. Lips*). Sudan : Jebel Marra, Kelling, 1 ♂, 2 ♀, i.1954 (*D. J. Lewis*). Ethiopia : Waldia, 1 ♂, ii.1936 (*J. W. S. Macfie*). It is also recorded by Mattingly (1954) from Tanganyika : Kware, xii.51–i.52.

Dixa (*Dixa*) *claripennis* Séguy.

Dixa claripennis Séguy, 1938, *Miss. Scient. Omo* **4** : 322.

Colour variable, mesonotum with three dark brown stripes, central one sometimes divided, background paler or yellowish with a good deal of pruinosity, not as shining as

capensis, thoracic pleura largely dark, usually with two narrow pale bands. Male styles inturned at apex, apical coxite process thumb-like.

This species is very similar to a number of Palaearctic species such as *D. nubilipennis* Curtis but it differs from them in the details of the structure of the male hypopygium.

♂♀. Wing length 3–4·5 mm.

Head dark brown and pruinose, face not noticeably paler, antennae of normal form, hairs in male shorter than *lunata*. *Thorax* variable in colour, not very shining; mesonotum with three dark brown stripes which are separated, though sometimes only obscurely so, background yellowish; shoulders often wholly pale, pruinosity well developed along hair lines and in prescutellar area; central stripe occasionally divided; pleura mostly brown but with two narrow horizontal yellow lines; scutellum brown, postnotum darker. *Legs*, yellowish-brown, knees slightly darker, posterior tibial enlargement as in *lunata*. *Wings* with venation much as in *lunata* (fig. 1, *b*), not as wide as *camerounensis*, r–m cross-vein distal to fork of Rs; small brown cloud over cross-vein and another along basal half of Cu in most specimens; M with macrotrichia on at least apical half. Halteres yellowish-brown. *Abdomen* brown; male hypopygium with styles characteristically inturned at apex (fig. 2, *c*), coxites with apical thumb-like process, basal lobe rounded.

I have not seen any of the type series which is in Muséum National d'Histoire naturelle, Paris (type locality, KENYA: Mt. Elgon, 8000 ft.).

Distribution.—ETHIOPIA: Koram, 9000 ft., 1 ♂, iii.1936 (*J. W. S. Macfie*). KENYA: Aberdare Range, Mt. Kinangop, 8–10,000 ft., 4 ♂, 3 ♀, x.1934 (*F. W. Edwards*); Mt. Elgon, Kapretwa, 6500 ft., 1 ♀ (*F. W. Edwards*); Mt. Elgon, Forest Zone, 8000 ft., 1 ♂, 1 ♀, ii.1935 (*F. W. Edwards*); Mt. Elgon, Heath Zone, 10–11000 ft., 10 ♂, 2 ♀, ii.1935 (*F. W. Edwards*). UGANDA: Ruwenzori Range, Bwamba Pass (west side), 5500–7500 ft., 1 ♂, 2 ♀, xii.34–i.35 (*F. W. Edwards*). NYASALAND: Zomba, 1 ♀, xi.1910 (*H. S. Stannus*). S. RHODESIA: nr. Inyanga, 2 ♀, i.1955 (*B. Stuckenberg*). TRANSVAAL: Blyde River, above Pilgrims' Rest, 1 ♂, ix.1954 (*A. D. Harrison*). NATAL: Zululand, Eshowe, 1 ♂, 1 ♀, vii–xi.1936 (*B. de Meillon*).

Dixa (*Dixa*) *bicolor* Wood.

Dixa (*Paradixa*) *bicolor* Wood, 1933, *Entomologist* **66**: 156.
Dixa (*Dixa*) *bicolor* Wood, 1934, *Stylops* **3**: 205–8.

Resembles *D. claripennis* but head and thorax much more shining and thoracic pleura pale with a single dark stripe; male hypopygium with styles less inturned, coxite processes smaller. In dry specimens, mesonotal stripes more or less fused, in most spirit material they appear separate.

Wood stated that the types of both this species and *capensis* were placed in the South African Museum, but Dr. Hesse tells me that no labelled type material is to be found in the Museum and appears never to have been presented as such. He has, however, been able to find three tubes of *Dixa* without identification labels with some Tipulid material presented by Wood to the South African Museum. Dr. Hesse has been kind enough to lend me these specimens and I find that all belong to *D. bicolor*. The specimens in one tube come from French Hoek which is the type locality of *capensis*, the others are from different localities. In addition there are two pairs of adults with some larvae and pupae in the British Museum (Nat. Hist.), identified by Wood as *bicolor* and sent by him to Dr. F. W. Edwards. Although the latter are not from the type locality they suffice to confirm my identification of *bicolor*. Wood's figure of

the male hypopygium of *bicolor* was drawn from the side and he has drawn parts of the basal sclerites as if they were hooked appendages. A dorsal view shows that there are no hooked appendages present.

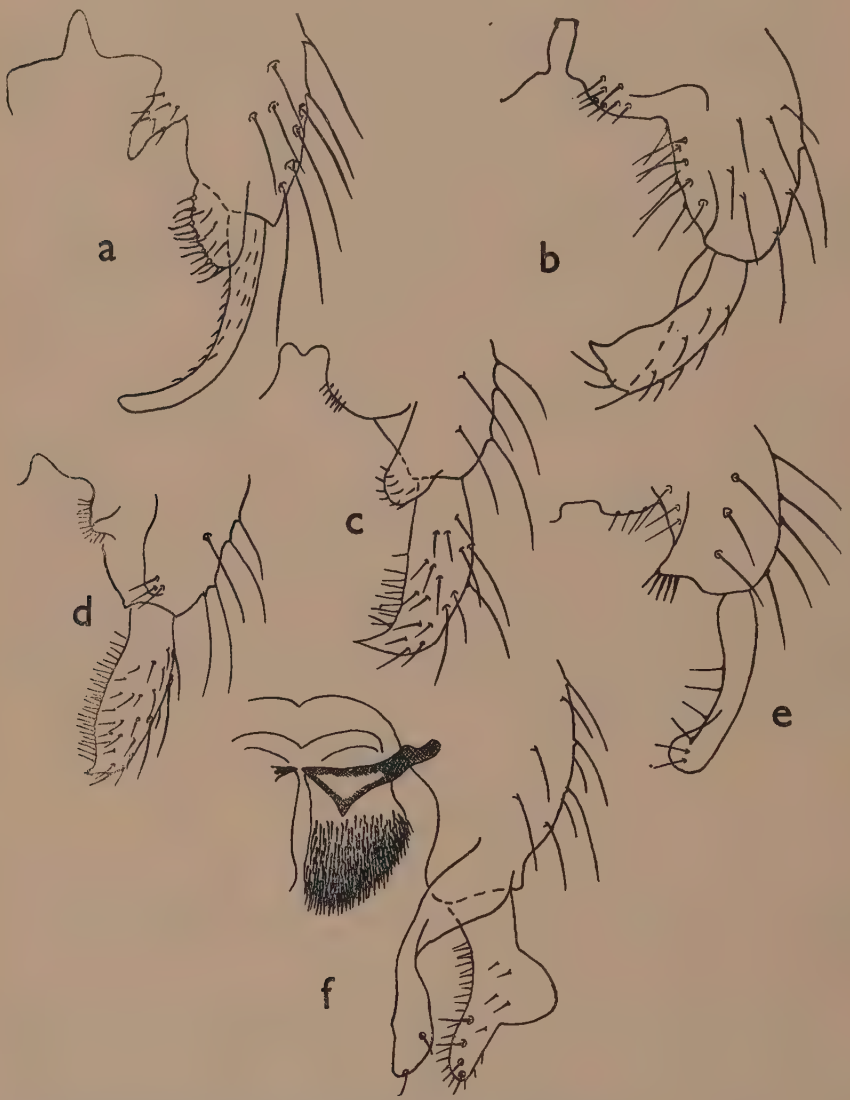


Fig. 2.—Coxites and styles of males of *Dixa*. (*a*) *D. camerounensis* ; (*b*) *D. lunata* ; (*c*) *D. claripennis* ; (*d*) *D. bicolor* ; (*e*) *D. capensis* ; (*f*) *D. harrisoni*.

♂♀. Wing length 2·5–3·0 mm.

Head brown and shining, face yellow, antennae normal. *Thorax* shining, mesonotal stripes dark brown, usually fused, shoulders dark, extreme lateral margins narrowly pale, pruinosity reduced, present in prescutellar area ; scutellum and postnotum brown ; pleura yellow with a broad central horizontal dark band. *Legs* yellowish-brown, posterior tibial

enlargement as in *lunata*. *Wings* similar to *claripennis*, halteres yellowish-brown. *Abdomen* dark brown; male hypopygium (fig. 2, *d*) with styles more or less of even width, very slightly inturned at apex, coxite processes small and poorly developed.

Type series, as mentioned above, probably lost. Type locality CAPE PROVINCE: Sneeuwgat, Winterhoek Mts.; Tulbagh.

Distribution.—CAPE PROVINCE: Kirstenbosch, 10 ♂, viii.1933 (*H. G. Wood*); French Hoek, 5 ♂ (*H. G. Wood*); Platteklip Stream, Cape Town, 2 ♂, 2 ♀, larvae and pupae, iv.1933 (*H. G. Wood*); Tulbagh Barrage, 1 ♀, xii.1952 (*K. M. F. Scott*). NATAL: Eshowe, 2 ♂, 3 ♀, viii–x.1936 (*B. de Meillon*); Natal National Park, 1 ♂, viii–1954 (*W. D. Oliff*).

Wood (1934) gives further records of CAPE PROVINCE: Worcester and Constantia (Cape Peninsula). In this paper he describes and figures the larvae and pupae; the larvae have the normal dorsal crowns of *Dixa sensu stricto* but they are absent from segment 2, being present only on abdominal segments 3–7.

Dixa (*Dixa*) *capensis* Wood.

Dixa (*Paradixa*) *capensis* Wood, 1933, *Entomologist* **66**: 154.

A dark species, pleura only pale around wing bases and along upper margin, mesonotal stripes more or less fused; head and thorax shining; posterior four coxae whitish; cross-vein r–m more or less opposite base of Rs, wings with distinct cloud over cross-vein and neighbouring veins; male styles narrow, flattened and expanded apically, apical coxite lobe well formed.

As explained under *bicolor*, there is no type material of this species in the South African Museum and it is probably lost. I am, however, in no doubt about the identity of the species because the male hypopygia of Dr. Stuckenberg's specimens agree so well with Wood's figure.

Male.—Wing length 3·5 mm.

Head dark brown and shining; face, mouthparts and antennae brown, antenna normal for the subgenus. *Thorax* dark brown and shining, stripes indistinct in dried specimens, more or less fused; pleura dark brown and shining except for upper margin and wing bases which are yellowish. *Legs* brown, anterior femora paler basally, posterior four coxae whitish. *Wings* with distinct cloud over fork of Rs and r–m, more or less distinctly extended back over M, Cu with a dark seam. Venation not unlike *lunata* (fig. 1, *b*) but r–m almost opposite fork of Rs; Wood mentions spur at base of Rs but this is not present in the two Natal males. Halteres dark. *Abdomen* dark brown; hypopygium (fig. 2, *e*) with narrow styles which are expanded and flattened apically, process at apex of coxite well formed; if whole hypopygium turned slightly then styles appear of uniform width as figured by Wood.

Female not known to me.

Type locality, CAPE PROVINCE: French Hoek.

Distribution.—Apart from the type series, known only from NATAL: Pietermaritzburg, Town Bush, 2 ♂, vii.1956 (*B. Stuckenberg*).

Dixa (Paradixa) harrisoni sp. n.

This is the only true *Paradixa* known to me from Africa south of the Sahara. It is extremely similar to the Palaearctic species *D.* (*P.*) *autumnalis* Meigen, from which it may be distinguished by the darker colour and by the detailed

shape of the various parts of the male hypopygium, especially by the much larger pubescent pads of the aedeagus and its triangular dark pointed lobes.

♂♀. Wing length 3·25–3·75 mm.

Head dark brown and with a broad central yellow stripe ; mouthparts dark, antennae (fig. 1, *e*) of the normal *Paradixa* form ; basal flagellar segment narrow and cylindrical, longer than in *Dixa sensu stricto*, segmentation more difficult to distinguish. *Thorax* mainly dark brown, mesonotal stripes fused ; each side of mesonotum including shoulders and lateral margins as far back as wing bases with a yellow stripe ; pleura brown with a broad median yellow stripe. *Legs* brownish, posterior tibial enlargement not very pronounced. *Wings* (fig. 1, *c*) unmarked, cross-vein r–m meeting Rs at the fork, M with macrotrichia on apical half or third only ; halteres brown. *Abdomen* brown ; male hypopygium (fig. 2, *f*) typical of the subgenus and quite different from that of other known African species. Styles with an outer rounded projection, coxites with a long curved process, as long as the style and bent sternally at the apex ; aedeagus complex, its important features are the pair of broad median pubescent pads and a pair of broad, blackened, triangular lobes turned sternally ; these are much smaller or quite differently shaped in Palaearctic species.

Holotype male and 1 ♀ paratype, viii.1954, and 1 ♀, v.1954, all from Transvaal : Olifantsvlei, nr. Johannesburg (*A. D. Harrison*) ; all are in the British Museum (Nat. Hist.).

References.

Alexander, C. P., 1926, An undescribed species of *Dixa* from West Africa. *Insec. Inscit. menstr.* **14** : 10–12.

——, 1928, Two undescribed Nematocerous Diptera from Belgian Congo. *Rev. Zool.-Bot. Afr.* **16** : 24–28.

Benoit, P. L. G., 1953, Un nouveau *Dixa* du Congo belge. *Rev. Zool.-Bot. Afr.* **48** : 202–3.

Cooper, J. L. and Rapp, W. F., 1944, Check List of Dixidae of the World. *Canad. Ent.* **76** : 247–252.

Edwards, F. W., 1929, The African species of *Dixa* (Diptera, Dixinae). *Entomologist* **62** : 160–1.

——, 1932, Diptera, fam. Culicidae. *Genera Insectorum* fasc. **194**.

——, 1934, The Percy Sladen and Godman Trusts Expedition to the Islands in the Gulf of Guinea, October 1932–March 1933.—Diptera Nematocera. *Ann. Mag. nat. Hist.* (10) **14** : 321–336.

Mattingly, P. F., 1954, East African Culicidae (Dipt.). *Arch. Hydrobiol.* **48** : 447–450.

Séguy, E., 1938, Diptera. I. Nematocera et Brachycera. *Miss. sci. Omo* **4** : 319–380.

Tonnoir, A. L., 1924, New Zealand Dixidae (Dipt.). *Rec. Cant. Mus.* **2** : 221–233.

Wood, H. G., 1933, Two new South African species of *Dixa* (Diptera). *Entomologist* **66** : 154–7.

——, 1934, Notes on the life history of *Dixa bicolor* Wood (Dipt.). *Stylops* **3** : 205–8.

ON TWO HYPOGASTRURIDAE (COLLEMBOLA) FROM INDIA.

By J. T. Salmon.

(*Victoria University College, Wellington, New Zealand.*)

The two species of Collembola discussed in this paper came from a collection made in India during 1951 by Dr. T. Clay of the British Museum (Natural History), to whom I am indebted for the opportunity to study this material. This paper is one of a series which will be issued dealing with this extensive collection of Collembola from India.

Family Hypogastruridae.

Genus *Xenylla* Tullberg, 1869.

Xenylla obscura Imms, 1912. (Figs. 1–6.)

In his original description of this species Imms states that the feet are unarmed and without tenent hairs. Cotypes of the species are deposited in the British Museum (Natural History). I have been able to examine these and I have found that the claw of each foot has a distinct inner tooth at two-thirds down, the basal inner face is distinctly granulated, and there is a very long, slender basal seta to each side: there are also two distinctly clavate tenent hairs, longer than the claw, to each foot (fig. 6). A number of specimens were present in Dr. Clay's collection which I have no hesitation in referring to this species following my examination of the cotype material. I can now give also a fuller description of the species as follows:

Colour: Above with deep greyish-blue granular pigment finely mottled over a pale cream or white base, the ventral aspect pale cream or white; appendages also mottled with greyish-blue, ocellar fields black.

Clothing: Moderate, or simple setae, mostly short but with some longer ones posteriorly.

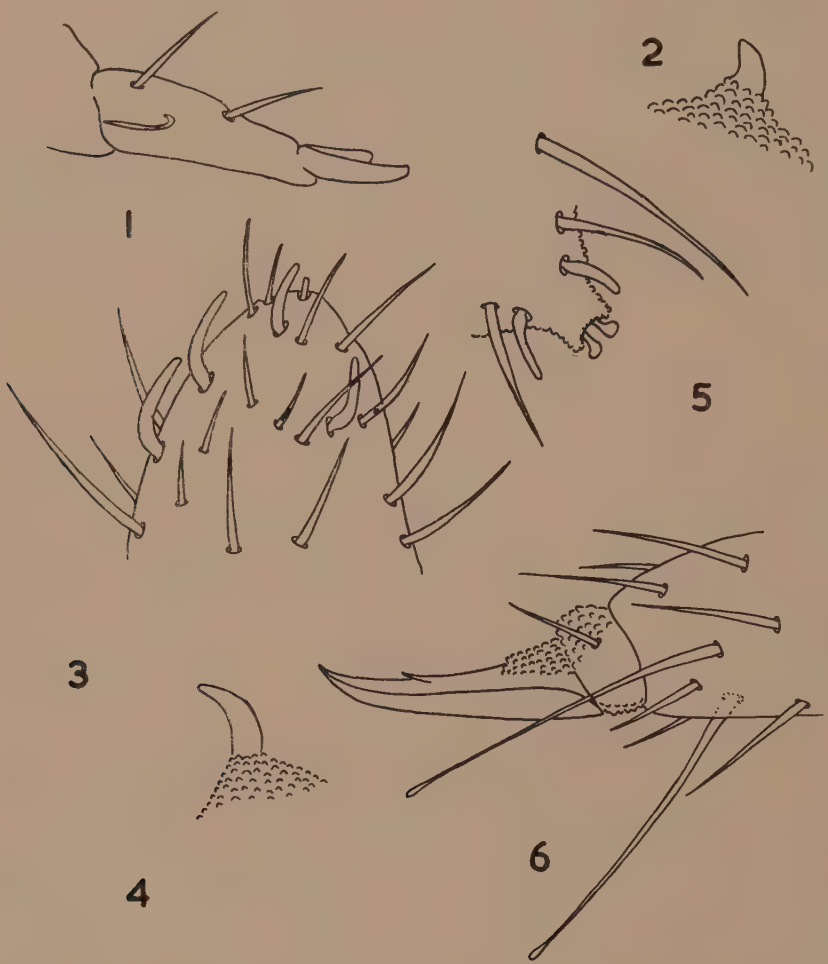
Body: Length to 1 mm. Antennae subequal to the head in length, the four segments related as 12 : 17 : 16 : 26; Ants. III and IV sometimes partly fused together; Ant. IV clothed with simple setae, both long and short, and bearing a short, straight, apical sense rod in a small socket, two to three short tapering apical sense-rods, four large, stout, bent, subapical sense rods of which two are always larger and very prominent; Ant. III with a sense organ consisting of two sense clubs behind a high, prominent, integumentary fold and two stout curved sense rods, fully exposed, one on each side of the base of the integumentary fold, the whole protected by two long guard setae. Ocelli five to each side, subequal. Anal spines small, on papillae, not contiguous, each spine curved on the posterior face, more or less straight on the anterior face and slightly longer than its papilla; the spine one and a half to three times longer than its breadth at base. Rami of tenaculum each with three barbs, the corpus without setae.

Legs: As described above.

Furcula: Mucrodens a little longer than manubrium, the mucrodens joint only partially fused and the mucro about half as long as the dens; the mucro rather thick, truncated apically with a slight upcurving towards the apex and a distinct central lamella extending from the base to two-thirds down, where it ends abruptly. The dens with two long simple setae on the posterior face.

Locality.—India : Gangtok, Sikkim ; 6000 ft., in dry decaying leaves.

Types.—A plesiotype and further specimens in the British Museum (Natural History) ; specimens also in the author's collection.



Figs. 1–6.—*Xenylla obscura* Imms. (1) Dens and mucro ; (2) anal spine ; (3) apex of Ant. IV ; (4) anal spine from cotype in British Museum (Natural History) ; (5) sense organ of Ant. III ; (6) hind foot from cotype in British Museum (Natural History). *All figures drawn to same magnification.*

Genus *Ceratophysella* Börner, 1932.

Ceratophysella indica sp. n. (Figs. 7–17.)

Colour : Medium to dark brown above with a dorso-lateral row of irregular shaped yellow marks down each side, usually one mark to each segment ; creamy-white below ; head dorsally with many irregular yellow blotches, ocelli on black fields, antennae dark brown ; legs and furcula creamy-yellow, the legs with brown markings.

Clothing : Moderate, short straight or slightly curved setae with, posteriorly, some longer simple setae. Setae of the antennae simple, moderately long and fairly numerous. Anterior face of each dens with three distinctly bent, stout, tapering setae and four other more slender setae arranged, usually, as two pairs on the basal section.

Body : Length to 0·8 mm. Antennae only very slightly longer than the head, the four segments distinct and related as 14 : 15 : 18/20 : 24 ; Ant. IV with three apical sensory

Figs. 7–17.—*Ceratophysella indica* sp. n. (7) Maxilla ; (8) mandible ; (9) postantennal organ ; (10) sense organ of Ant. III and sensory sac ; (11) apex Ant. IV ; (12) ocelli and postantennal organ ; (13) anal spine ; (14) rami of tenaculum ; (15) mucro and apex of dens from side ; (16) dens and mucro from latero-posterior aspect ; (17) hind foot. *All figures, except figs.* 7–8, *drawn at same magnification. Figs.* 7–8 *at two-thirds magnification of the others.*

knobs, five to six stout, curved, subapical sense rods, two to three slender, straight, tapering apical sense rods and clothing of relatively long simple setae ; Ant. III with typical sac-like sensory organ and a pair of small, bent sense rods behind an integumentary fold with a long, stout, curved exposed sense rod at each end of and below the fold. Ocelli, eight to each side, subequal ; postantennal organ with four to five irregular foliaceous lobes arranged around a central ill-defined zone, the whole about as large as a single ocellus. Mandible

with five large apical teeth, and four very large basal teeth overlying the molar area ; head of maxilla with a pair of large, curved, apical teeth and a small, bent, finger-like process. A pair of long anal spines on papillae, not contiguous, each papilla about one-quarter as long as its spine, the papilla and spine being equal to the mucro in length and the spine curved on its posterior face, but almost straight on its anterior face. Cuticle granulate. Rami of tenaculum each with four barbs, and a basal tubercle, corpus without any setae.

Legs : Claw with a single inner tooth only at about centre, and a long, slender basal seta to each side ; unguiculus vestigial, being reduced to a small tubercle about one-eighth as long as the claw ; a single faintly clavate tenent hair, as long as the claw, to each foot.

Furcula : Manubrium 38, dens 27, mucro 18. Mucro open, boat-shaped and lamellate on basal two-thirds, closed and tapering on distal third ; the outer lamella arises on the inner basal corner to swing across the base to the outer edge and pass forward to rise to a point just beyond midway ; the inner lamella is broad, semicircular, rising obliquely from the inner basal corner to curve upwards and outwards and finally down to the mid-longitudinal line of the mucro at about one-third from base.

Locality.—Holotype, INDIA : Gangtok, Sikkim ; amongst dry rotting leaves, 6000 ft. (*Dr. T. Clay*).

Types.—Holotypes and paratypes in the British Museum (Natural History) ; paratypes in author's collection.

Remarks.—Differs from all other species of the genus through its vestigial unguiculus and the faintly clavate tenent hair.

CORRIGENDUM.

In my paper on "New genera and species of Neanurinea (Collembola) from East Africa" (1954, *Proc. R. ent. Soc. Lond.* (B) **23** : 1–9), an error has crept in to the legend of the figures.

On p. 2 the descriptions of figures 5 and 6 should be transposed, fig. 5 being the maxilla and fig. 6 the mandible of *Setanurida salti* sp.n.

The same applies to figs. 10, 11 and 12 on p. 3. Fig. 10 is the maxilla showing lamella on dorsal side, fig. 11 the maxilla from ventral side and fig. 12 is the mandible of *Setanurida nigrissima* sp.n.

THE NOMENCLATURE OF *PROTOCALLIPHORA* (DIPTERA : CALLIPHORIDAE).

By Curtis W. Sabrosky[1]

(*Entomology Research Branch, Agricultural Research Service, U.S. Department of Agriculture.*)

The genus *Protocalliphora* Hough has attracted wide attention because the maggots are obligatory blood-sucking parasites of nestling birds. However, the identity of the type species of the genus, *Musca azurea* Fallén, has been the subject of considerable disagreement in the literature. Although the name *azurea* has long been applied to one or more species of these parasites, Ringdahl (1937, 1945) and Hennig (1939) proposed to transfer it to a saprophagous species in a different genus, *Protophormia* or *Phormia*, to replace the well-known specific name *terrae-novae* Robineau-Desvoidy, formerly *groenlandica* Zetterstedt. The generic name *Protocalliphora* was preserved for the bird blowflies by recognising *azurea* of authors as type-species, although by a strict interpretation of type-species designation the name *Protocalliphora* would also have had to be transferred to the saprophage, admittedly a confusing and unfortunate result. Other authors (e.g., van Emden 1954) have disagreed with that interpretation of *azurea*. Revisions now in progress, on the Palaearctic species by Zumpt and the Nearctic by Sabrosky and Bennett, have required consideration of the problem, and it is hoped that the discussion set forth below will clarify ahe situation.

In 1953 I examined all material of *Protocalliphora* now in the Fallén and Zetterstedt collections, at Stockholm and Lund, respectively. As a result of this examination and of the recognition of Meigen (1826) as the first reviser of *Musca azurea* Fallén, it is possible to resolve the problem on a straight zoological basis, without involving the complications of a misidentified type-species and an application to the International Commission on Zoological Nomenclature. In this paper the history of the problem is outlined chronologically, with such explanatory notes as are necessary.

Numerous references to *Protocalliphora azurea* have not been cited, because they do not contribute directly to the problem of the identity of *azurea*, although they would show the long-standing use of the name for the bird blowflies. Among the important publications on *Protocalliphora* in this sense are those by Bezzi and Stein (1907, *Katalog der paläarktischen Dipteren* **3** : 544–545), Bezzi (1922, *Parasitology* **14** : 32–35), Séguy (1928, *Encycl. Ent.* (A) **9** : 161–167), and Séguy (1929, *Encycl. Ent.* (B) II, Diptera **5** : 73–78). References by Hough (1899), Hendel (1901), and Hall (1948) are included, however, as the basic generic references.

[1] I am deeply indebted to Drs. R. Malaise and F. Bryk of Stockholm and Dr. C. H. Lindroth of Lund for many courtesies during my study of the Fallén and Zetterstedt collections, and to Dr. F. van Emden of London and Dr. F. Zumpt of Johannesburg for advice and criticism on this problem.

What is *Musca azurea* Fallén ?

1816. *Musca azurea* Fallén, *Acta Holmiae* : 245 (Westergöthland) ; 1821, *Diptera Sueciae, Muscides* : 46.

This brief, generalised description possibly agrees best with *Protophormia terrae-novae* (R. D.), a common northern species not otherwise treated in the *Diptera Sueciae*. The specimens now in Stockholm under Fallén's label "*azurea*" (two males and one female, the first male bearing both Fallén and Hennig labels) are indeed *terrae-novae*, and they have been accepted by Ringdahl and Hennig as fixing the identity of Fallén's *azurea*. However, there is contemporary evidence from two sources that the original *azurea* was a mixed species, with dark males of *Protocalliphora* confused with *terrae-novae* (Cf. Meigen, 1826 *loc. cit.*, and Zetterstedt, 1838, *loc. cit.*). It is known that for some species all or part of the original Fallén series are now located at Lund rather than in Fallén's own collection at Stockholm, because Zetterstedt's division of the material did not always segregate correctly or completely the original specimens of Fallén's *Diptera Sueciae*. [Example : *Tachina obscura* Fallén was described from a pair taken in copula at Esperöd ; the pair is now in the Zetterstedt collection at Lund. Cf. van Emden, 1954, *loc. cit.*: 73.] In complex problems of identity, it is not sufficient to depend on a specimen or two loaned from one of these collections. One should see the entire series from both, and should trace the history of the specimens as far as possible. The tracing can often be done because of the remarkable detail, particularly for that early period, in the *Insecta Lapponica* and the 14 volumes of the *Diptera Scandinaviae*.

1826. *Musca azurea* Fallén ; Meigen, *Syst. Beschr. europ. zweifl. Insekten* **5** : 63–64.

After the description, which is that of a *Protocalliphora*, Meigen comments : " Falléns *M. azurea* is keine reine Art, nur das Männchen gehöret hiehin, das Weibchen aber zu *M. florea*." This is clearly a recognition that *azurea* Fallén is a mixed species, and that the species represented by the male is to be accepted as typical. Fallén's original description shows no basis for such distinction, and Meigen accordingly must have seen Fallén's material in order to arrive at such a conclusion. Meigen, in company with Wiedemann, visited Fallén and Zetterstedt at Lund in July 1823 and studied the collections there (see Meigen, 1824, *Syst. Beschr.* **4** : vi. He and Wiedemann were welcomed " mit offenen Armen " by Fallén and Zetterstedt, " die uns mit der grössesten Gefälligkeit ihre Sammlungen schwedischer Zweiflügler zur Vergleichung offen legten . . . "; see also Förster's biography of Meigen, 1846, *Stettin. ent. Ztg.* **7** : 66–74, 130–141). The mixed status of *azurea* may very well have been discussed and known to all four at that time. Incidentally, " *M. florea* " is a manuscript name to which Meigen for some reason did not again refer.

It is also possible that *azurea* was in Fallén material studied at home by Meigen. In the introduction to the first volume (1818) of his *Systematische Beschreibung*, Meigen wrote : " Die meisten von dem berühmten Professor Fallén zu Lund in Schweden öffentlich gemachten Arten, haben wir durch des Verfassers Freigebigkeit gleichfalls zur Ansicht und Verglichung gehabt " (p. xix).

1838. *Musca azurea* Fallén ; Zetterstedt, *Insecta Lapponica* : 657.

Zetterstedt revised the Fallén material and segregated two species from the mixture under *azurea*, *groenlandica* sp. n. (now a synonym of *terrae-novae*) and *azurea* s. str. Under *groenlandica* he stated that it had been confused with *azurea* in the Fallén collection. Under *azurea* he said that he had the very specimens that Fallén had before his eyes when about to describe *azurea* (" vera ipsissima, quam ante oculos habuit Cl. Auctor suam speciem descripturus "). The Zetterstedt collection at Lund bears out the accuracy of the segregation. Five specimens (four males and one female) of *azurea* are *Protocalliphora* and the numerous specimens of *groenlandica* are *terrae-novae*. Zetterstedt's action has been accepted as that of a first reviser by van Emden (1954, *loc. cit.* : 121). I believe that Meigen (1826) was actually the first reviser, but in any event the two actions were in harmony and were concerned with the same material, *azurea* in the Fallén collection and the mixed series which they recognised in it.

1899 (March). *Protocalliphora* Hough, *Ent. News* **10** : 65–66.

The genus was proposed for *Musca azurea* Fallén and *M. chrysorrhoea* Meigen, the former designated as type. *Protocalliphora* is clearly distinguished morphologically from *Phormia*, in which Hough included *groenlandica* Zetterstedt. Later in the same year (*Biol. Bull.* **2** (6) : 288–290), Hough noted that *groenlandica* is a synonym of *terrae-novae*.

1901. *Avihospita* Hendel, *Wien. ent. Ztg.* **20** : 29.

This genus was proposed for five species of bird blowflies, with type designated as " *Musca azurea* (Fall.) Mg." This wording indicates that Hendel accepted Meigen's restriction. *Avihospita* is an objective synonym of the prior *Protocalliphora* Hough (1899), as noted by Aldrich (1901, *Wien. ent. Ztg.* **20** : 68).

1918. *Phormia azurea* (Fallén) Villeneuve, *Bull. Soc. ent. Fr.* **1918** : 159 : " Il est bon de faire remarquer ici que Zetterstedt [sic] a décrit son *Musca azurea* d'après le type même de Fallén".

1924. *Protocalliphora azurea* (Fallén) Stein, *Arch. Naturgesch.* **90** (A), (6) : 261 : " Ich habe seinerzeit *die Type in Lund* untersucht . . . " [italics mine].

1937. *Musca azurea* Fallén ; Ringdahl, *Ent. Tidskr.* **58** : 38.

In comments on Fallén types in Stockholm, Ringdahl stated that the two males and one female of *Musca azurea* Fallén are " mit *Phormia terrae-novae* R. D. und *groenlandica* Zett. identisch".

1939. *Protophormia azurea* (Fallén) (synonym, *Protophormia terrae-novae* R. D.) Hennig, *Arb. physiol. angew. Ent.* **6** : 359–364.

A so-called " type " of *Musca azurea* Fallén, borrowed from Stockholm, was found to be the saprophagous species *Protophormia* (or *Phormia*) *terrae-novae* (cf. also Ringdahl, 1937). Hennig thereupon transferred the name *azurea* from the bird blowflies to the saprophagous *Protophormia*, where it replaced the younger name *terrae-novae*, but he retained *Protocalliphora* for the bird blowflies on the ground that the real type-species is the misidentified *azurea* which he regarded as a synonym of *sordida* Zetterstedt.

1945. *Protocalliphora azurea* Fallén ; Ringdahl, *Opusc. ent.* **10** : 35.

Under this heading, in a report on the Zetterstedt Tachinidae (sens. lat.), Ringdahl recognised that, although the " true *Musca azurea* Fall. is identical with *Phormia groenlandica* Zett. as shown by the type specimen in the Riksmuseum," there is in the Zetterstedt collection a second species under the name *azurea* Fallén which is the one known as a bird parasite. He could not determine the proper name for the latter.

1948. *Apaulina* Hall, *The Blowflies of North America* : 179, type-species *Protocalliphora avium* Shannon & Dobroscky (Nearctic).

The characters listed for this proposed genus intergrade and vary, and I regard it as part of the Holarctic genus *Protocalliphora*. **Syn. nov.**

1952. *Protocalliphora sordida* (Zetterstedt) (*azurea* auct.) and *Protophormia terrae-novae* (R. D.) ; Hennig, *Die Larvenformen der Dipteren*, Part 3 : 422–423.

azurea Fallén is not used in either genus in this work, although it is older than any other name in either.

1954. *Protocalliphora azurea* (Fallén) van Emden, *Handbooks for the Identification of British Insects*, **10** (4*a*) : 121 (footnote).

Zetterstedt (1838) is accepted as the first reviser, and *P. azurea* s. str. is thus applied to the bird blowflies.

In conclusion :

(1) The writings of Fallén's contemporaries, Meigen and Zetterstedt, are compelling evidence that *Musca azurea* Fallén was a mixed species, though probably principally the species now known as *Protophormia* or *Phormia terrae-novae* (R. D.).

(2) The first reviser of the mixed species was Meigen (1826). Meigen's statement is as unequivocal an expression of restriction as one could wish for. That of Zetterstedt (1838) is equally clear and direct, is concerned with the same material as that of Meigen, is in harmony with it, and is important supporting evidence.

(3) In my opinion, action of a first reviser takes precedence over later actions, even if one of the latter involves selection of a lectotype or a neotype. Such a selection would be unacceptable if not consistent with the action of the first reviser. The identifications by Ringdahl and Hennig of *azurea* as equal to the saprophagous species *terrae-novae* are antedated by, and are not consistent with, the restriction by Meigen, supported by Zetterstedt.

(4) The interpretation of *azurea* Fallén as a bird blowfly, as restricted by Meigen and Zetterstedt, is not only a nomenclaturally logical conclusion, but it has the great practical advantages of being consistent with almost universal usage since 1826 (except Ringdahl and Hennig) and of avoiding the complication of a misidentified type-species problem.

Lectotype for *Musca azurea* Fallén.

It is desirable to fix a lectotype for *M. azurea*, if at all possible. Hennig (1939, *loc. cit.*: 360) refers to the " Typus von *Musca azurea* " which he examined, but that specimen is *terrae-novae* and thus is not consistent with the

action of the first reviser, as discussed above. Villeneuve (1918) and Stein (1924) both referred to the type of *azurea*, but they did not label a definite specimen as type in the collection, nor did they give any information for recognising a particular specimen as such.

Fallén stated that he received *azurea* (both sexes) from " Hr. Majoren och Ridd. GYLLENHAL från Westergôthland". No specimens in either the Fallén or Zetterstedt collections bear labels definitely linking them with Gyllenhal or Westergôthland. In the Zetterstedt collection of " Diptera Scandinaviae " at Lund, there are five specimens (four males and one female) under *azurea*, all true *Protocalliphora*. Only the males need be considered (cf. Meigen, 1826, who limited *azurea* to the species represented by the males of *azurea* Fallén). One of the males is labelled " Lärket", meaning Lärketorp in Ostrogothia, and this was apparently the specimen recorded by Zetterstedt in *Diptera Scandinaviae* **4** : 1334 (1845). Two other males bear small white squares indicating that they were collected on an 1821 trip to Lapland and on to North Cape. They obviously cannot be part of Fallén's original material. The fourth male is unlabelled, like much material in old collections. It might have been, or at least cannot be demonstrated not to have been, one of Fallén's original specimens. This individual has the squamae quite brownish along their outer margins, and it could well have been mixed with the normally dark *terraenovae*.

Although definite proof cannot be given, I believe that this was one of the original specimens. Since it is consistent with the action of the first reviser, and is the only relevant specimen which cannot be eliminated from consideration on the basis of available information, I believe that it should be considered the lectotype of *azurea*.

Lectotype for *Musca sordida* Zetterstedt.

This species has often been considered a synonym of *azurea*. Hennig (1939, *loc. cit.* : 360, 361) refers to and figures the male genitalia of the " Typus " of *sordida* borrowed from Lund. However, *sordida* was originally described from two females from Lycksele (1838, *Insecta Lapponica* : 657), one of which is still extant in the Insecta Lapponica collection kept separate at Lund. This female, apparently the sole survivor of the original syntypes, should be regarded as the lectotype, and I have so labelled it in the collection at Lund.

The male dissected by Hennig bears the label " M. sordida ♂/Äskilje Lapp /57. Holmgr." This fits the specimen recorded by Zetterstedt in 1859 (*Diptera Scandinaviae* **13** : 6185 : " In Lappon. Umensi ad Äskilje d. 16–19 Jun 1856, ♂ raro, Holmgren."). Four other specimens of *sordida* at Lund can be associated from the data on the labels with specimens recorded by Zetterstedt in 1845 and 1852 (*Diptera Scandinaviae* **4** : 1332 ; **11** : 4319).

DORILAIDAE (PIPUNCULIDAE) FROM THE COMMONWEALTH INSTITUTE OF ENTOMOLOGY.[1]

By D. Elmo Hardy.

(University of Hawaii, College of Agriculture, Agricultural Experiment Station, Honolulu, Hawaii.)

[Communicated by Dr. F. I. van Emden]

I recently received from Dr. F. I. Van Emden a small collection which contained one new species of sugar cane leafhopper parasite from Mauritius and an additional specimen of the poorly known African genus *Congomyia* Hardy ; the latter had previously been known only from the male. This brief report concerns this material.

Congomyia nigripennis Hardy. (Fig. 1.)

Congomyia nigripennis Hardy, 1949, *Bull. Inst. Sci. nat. Belg.* **25** (39) : 7–10, figs. 5*a–e*.

This peculiar species has previously been known only from the type male from Eala, Belgian Congo. It is readily distinguished from all other members of the family by the closed and petiolated cell R_5 in the wing ; also the dark brown fumose wings and the well developed first antennal segment are distinctive.

A female specimen at hand apparently fits this species, although it is slightly smaller than the type.

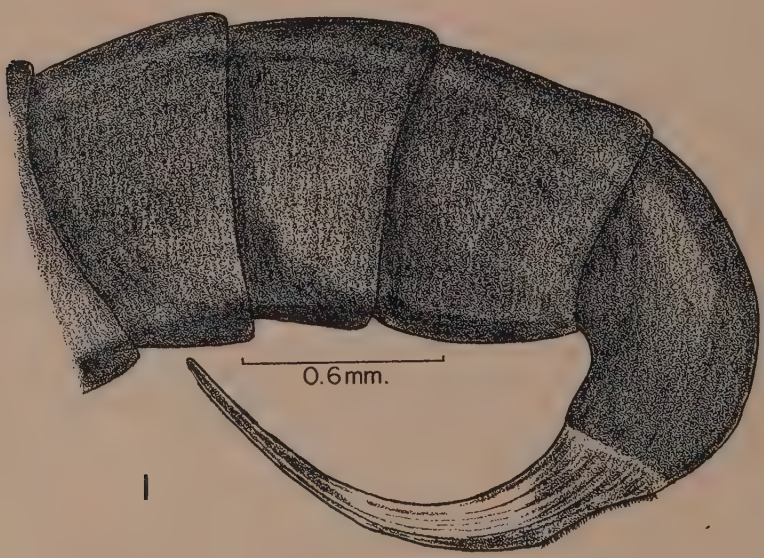


Fig. 1.—*Congomyia nigripennis* Hardy. Abdomen of female, lateral view.

[1] Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Technical Paper No. 370.

Humeri brownish-yellow, rather than black, and third section of costa slightly shorter than fourth, rather than twice as long. Petiole of cell R_5 (apical cell) slightly longer than in the male, at least half as long as the r-m crossvein, and the last section of vein M_{1+2} more sinuate. Front predominantly shining black, grey pubescent at the lower portion for a distance about equal to its width and with a thin grey line extending along each margin. In the median part the front equal in width to six eye facets; rather strongly narrowed on the upper portion to a width of about three facets. Ocellar tubercle small, scarcely raised above level of compound eyes. From a lateral view the hind margin of each eye curves inward slightly just above the middle. No distinct bristles present on mesonotum but sides of front portion rather thickly covered with fine pale brown hairs. Abdomen moderately shining brown, faintly grey on apices and sides of terga. Sixth abdominal segment well developed, about one-third longer than the fifth. First tergum with a tuft of short bristles on side but lacking the row of long bristles which most Dorilaids possess. Ovipositor very well developed. Basal portion rather cylindrical and reddish-brown to black. Piercer reddish, long, slender and curved, extending almost to base of fourth abdominal segment (fig. 1).

Length: body, 6·0 mm.; wings, 7·5 mm.

The specimen at hand is from Belgian Congo: Katanga, Tenke, 30.vii–9.viii.1931, (*Mrs. L. Ogilvie*). It has been returned to the Commonwealth Institute of Entomology at the British Museum (Natural History).

Dorilas (Dorilas) mauritianus sp.n. (Figs. 2*a–d*.)

This runs to *D. laeviventris* (Loew) in my key to the African Dorilaidae (Hardy, 1949, *Mem. Inst. Sci. nat. Belg.* (2) **36**: 11) but differs in having the abdomen sparsely pilose, the second and most of the third tergum opaque black and the male genitalia with a longitudinal cleft extending across the apex (fig. 2*b*).

Male.—Head: Eyes joined for a distance about equal to the length of the front. Front grey pubescent except for a round, bare, polished black spot in the median portion. First two antennal segments black, bristles of under part of second segment extending as far as apex of third. Third segment yellow, short, acute (fig. 2*a*). *Thorax:* Opaque black, dusted with brown on the dorsum, grey on the sides. Humeri black, halteres yellow, tinged with brown at their apices. Each propleuron with a fan of pale bristles. *Legs:* Predominantly yellow, coxae black; each femur with a ring of pale brown around the middle. Femora comparatively stout, flexor spines well developed on apical half of hind pair. Hind tibiae with several rather strong erect anterior bristles near the middle of the segment. *Wings:* Hyaline, stigma filling all of the third costal section. Third approximately equal to the fourth, the two sections combined being equal to the length of the fifth. r-m crossvein situated at or near middle of cell 1st M_2 and vein M_{1+2} is straight or nearly so. *Abdomen:* sides slightly rounded, widest at junction of segments three and four. First tergum with a row of 8–10 black bristles on each side. Terga one and two and basal margin and middle portion of three opaque velvety black. Sides of three, all of four (except for a narrow opaque line of black at base) and five polished black. *Genitalia:* largely moderately shining, grey dusted, about two-thirds as long as fifth abdominal segment and with a narrow, longitudinal cleft extending over the apex (fig. 2*b*). From a ventral view (of the relaxed genitalia) ninth segment has a moderately developed "U"-shaped cleft on hind margin. Outer clasper rather slender, sharp pointed and curved at apex; and inner clasper bilobed at apex (fig. 2*c*).

Length: body, 3·4 mm.; wings, 4·3 mm.

Female.—Upper half of front polished black, sides slightly converging before the ocelli; lower portion and face silvery grey. *Legs* entirely yellow, except for the black coxae. *Abdomen* subopaque, dusted with grey. Base of ovipositor subglobose, piercer straight, about equal in length to the base and extending to apex of first abdominal segment (fig. 2*d*).

Length: body, 3·0 mm.; wings, 3·8 mm.

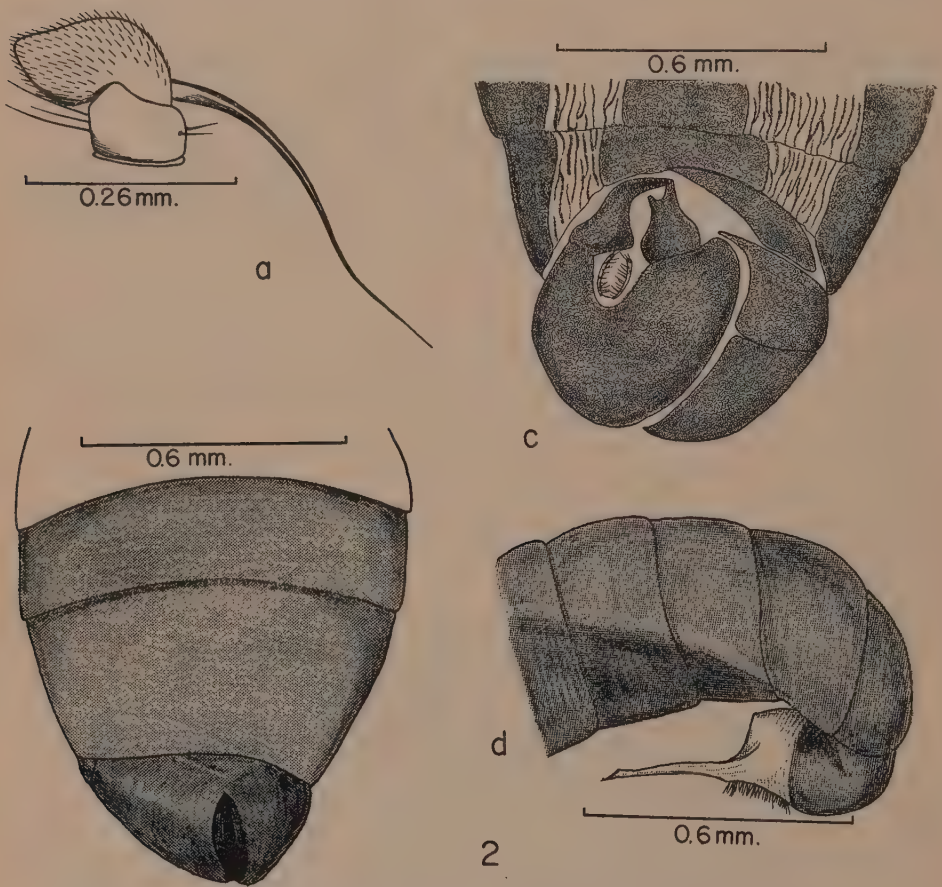


FIG. 2.—*Dorilas* (*Dorilas*) *mauritianus* sp. n. (*a*) Antenna; (*b*) male genitalia, dorsal; (*c*) male genitalia, ventral; (*d*) female abdomen, lateral.

Holotype male, MAURITIUS: ex *Perkinsiella saccharicida* Kirk., ix.1955 (*J. R. Williams*). Allotype female and one paratype male, same data as type and three paratypes same locality and collector as type: one male and one female " caught on sugar cane ", x and xi.1955 and one female ex *Dicranotropis muiri* Kirkaldy, vii.1955.

Type, allotype, and two paratypes returned to Dr. F. I. Van Emden, Commonwealth Institute of Entomology for deposition in the British Museum (Natural History). One paratype is being deposited in the U.S. National Museum and one is in the University of Hawaii collection.

A REVISION OF THE GENUS *OXYECOUS* CHOPARD, 1935 (ORTHOPTERA: TETTIGONIIDAE).

By D. R. Ragge.

(*British Museum (Natural History)*.)

This genus has hitherto been monotypic, based on the interesting species *Oxyecous lesnei* Chopard (fig. 1); its known range has been confined to Mozambique. A search through the Orthoptera accessions of the British Museum (Natural History) has revealed that this species also occurs in Southern Rhodesia, Northern Rhodesia and Belgian Congo, and specimens belonging to three further species of *Oxyecous* Chopard show that the genus extends into Kenya, Uganda and Tanganyika.

I am much indebted to Mr. J. A. Whellan for sending me six specimens of the type species which he collected in Southern Rhodesia. Two specimens of *Oxyecous* Chopard were found amongst material on loan, through the courtesy of Mr. P. Basilewsky, from the Musée Royal du Congo Belge.

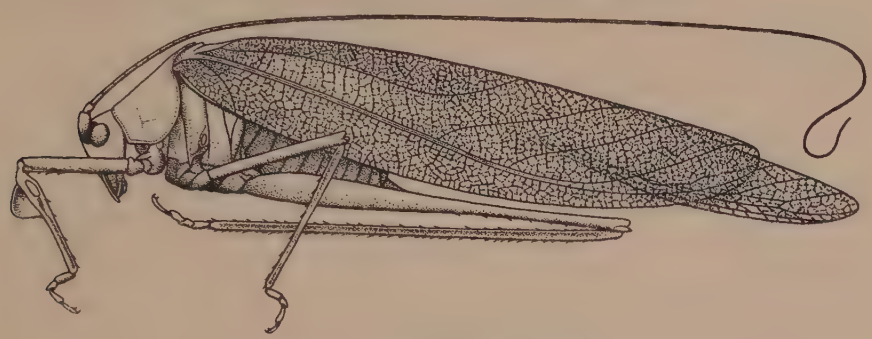


Fig. 1.—*Oxyecous lesnei* Chopard.

In the descriptions the terms "dorsal", "ventral", "internal" and "external", as applied to the spinules and spurs of the legs, are used on the assumption that the legs are extended horizontally, the fore legs forwards and the other two pairs backwards. The dorsal spines of the hind tibiae are often in various sizes; every size is included when these are counted. The wing-vein terminology used is that of Ragge (1955). The descriptions of coloration are intended to apply to fresh or unfaded specimens; although the general coloration is probably always green in this genus, dried specimens will frequently be brown due to *post mortem* colour-changes.

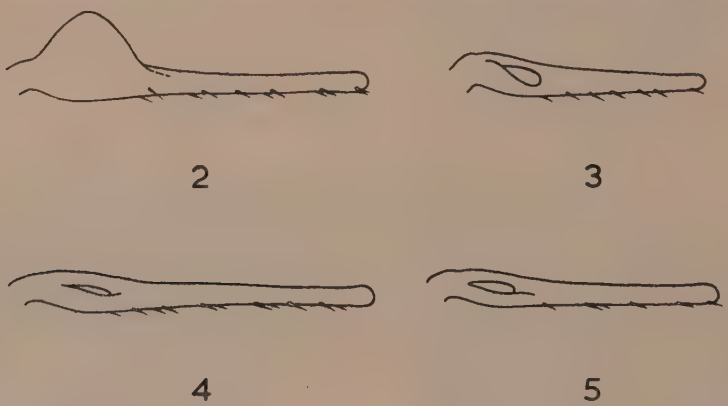
A word of explanation is necessary regarding the measurements given, for help with which I am indebted to Miss P. M. Stock. The expression "total length" refers to the distance from the most anterior part of the head to the tips of the flexed hind wings. The measurement of the exposed part of the hind wings was, of course, taken with the wings in their position of rest. The measurement given for the ovipositor is the distance from its apex to the tip of the

subgenital plate. The pronotal length, length of the fore tibia and length of the ovipositor were measured with a screw micrometer eyepiece ; the remaining measurements were all made with vernier callipers. All measurements are given in millimetres, and in each case the number of specimens measured is given in parenthesis.

Oxyecous Chopard, 1935.

Oxyecous Chopard, 1935, Contributions à l'étude de la faune du Mozambique. Voyage de M. P. Lesne (1928–1929). 19e Note.—Orthoptères Ensifères. *Mem. Mus. zool. Univ. Coimbra* (I) **85** : 4.

Diagnosis.—Fore coxae with dorsal lobiform process (fig. 6). Fastigium of vertex moderately compressed, depressed towards apex, not or slightly sulcate above (fig. 7). Fastigium of frons tapering to sharp dorsal point (fig. 8). Pronotum somewhat compressed, smoothly rounded above ; lateral lobes with distinct angle in antero-ventral region of margin, as in fig. 1. Inner tympanum of fore tibiae to some extent obscured by development of ventral margin, which may be produced into large operculum (figs. 2–5 and 9).



Figs. 2–5.—Lateral view of the inner side of the left male fore tibia of (2) *Oxyecous lesnei* Chopard ; (3) *O. apertus* sp. n. ; (4) *O. magnus* sp. n. ; (5) *O. undulatus* sp. n.

The lobiform process of the fore coxae of this genus, which belongs to the Phaneropterinae, is very characteristic and probably distinguishes it from all other Tettigoniid genera.

In general appearance the members of this genus are moderate-sized, green bush-crickets, with fairly broad, irregularly veined fore wings and a rather compressed pronotum totally lacking in carinae (see fig. 1). The genitalia of both sexes are of a simple type : the ovipositor is robust and of moderate size, and the male cerci are relatively unspecialised. In texture the fore wings are generally membranous and translucent in the males, while those of the females are rather thicker and sometimes almost opaque. In *O. lesnei* Chopard the transparent region near the base of the right fore wing of the male is particularly well-marked (see fig. 15), the venation of the proximal part of areas C and R being very sparse in comparison with that of the rest of the wing ; the radial area of the left fore wing is affected in a similar way in this species, though to a much smaller extent. This modification, which is doubtless correlated with the function of the fore wings as resonators in stridulation, is not shown by the

females. In all the four species described here there are ventral spinules on the distal part of the hind femora.

Distribution.—*Oxyecous* Chopard covers most of east and south-east Africa, from Uganda to Southern Rhodesia. Its range includes the southern part of Belgian Congo, but possibly does not extend into West Africa.

FIGS. 6–8.—*Oxyecous lesnei* Chopard. (6) Lateral view of the left fore coxa, showing the dorsal lobiform process. (7) Dorsal view of the anterior part of the head. (8) Anterior view of the dorsal part of the head.

KEY TO THE SPECIES.

Males.

1 Fore tibiae with a large operculum covering the inner tympanum, as in fig. 2. Base of the left fore wing with a distinct lobe on the posterior wing margin, as in fig. 16 . . . . . **lesnei** Chopard
– Fore tibiae without a large operculum (figs. 3–5). Base of the left fore wing without a lobe 2
2 Total length more than 48 mm. Cerci as in fig. 13 . . . . **magnus** sp. n.
– Total length less than 48 mm. Cerci as in figs. 12 or 14 3
3 Length of pronotum/length of fore tibia ratio more than 1·1. Cerci as in fig. 12 . . . . . **apertus** sp. n.
– Length of pronotum/length of fore tibia ratio less than 1·1. Cerci as in fig. 14 . . . . . **undulatus** sp. n.

Females.

Females are so far unknown in *O. magnus* sp. n. and this sex is not yet known for certain in *O. undulatus* sp. n.; females of the remaining two species may be separated by the couplet given below.

1 Fore tibiae longer than the median length of the pronotum, their inner tympanum very nearly or completely obscured, when viewed laterally, as in fig. 9 . . . . . **lesnei** Chopard
– Fore tibiae shorter than the median length of the pronotum, their inner tympanum open, as in fig. 3 . . . . . **apertus** sp. n.

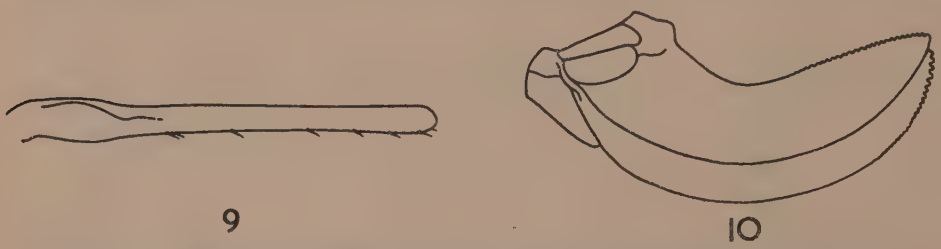
Oxyecous lesnei Chopard, 1935.

Oxyecous lesnei Chopard, 1935, Contributions à l'étude de la faune du Mozambique. Voyage de M. P. Lesne (1928–1929). 19e Note.—Orthoptères Ensifères. *Mem. Mus. zool. Univ. Coimbra* (I) **85** : 4. Holotype ♂, MOZAMBIQUE : environs de Vile Pery, région du mont Malengé, iii.1928 (*Vandouzi*). In the Muséum National d'Histoire Naturelle, Paris.

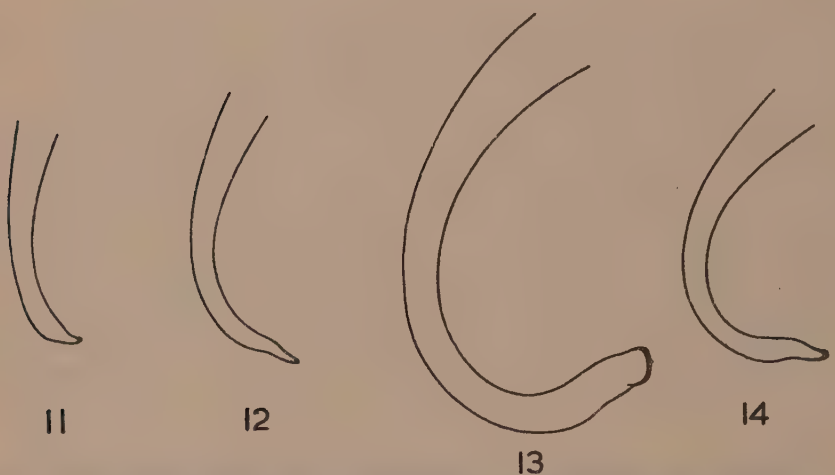
Diagnosis. Male.—Fore tibiae with large operculum completely obscuring inner tympanum, as in fig. 2. Basal part of costal and radial areas of right fore wing trans-

parent with sparse venation (fig. 15). Base of left fore wing with distinct lobe on posterior wing-margin, in region of stridulatory organ (fig. 16). Cerci as in fig. 11.

Female.—Inner tympanum of fore tibiae very nearly or completely obscured, when viewed laterally, by development of ventral margin, as in fig. 9. Fore tibiae longer than median length of pronotum.



FIGS. 9–10.—*Oxyecous lesnei* Chopard, female. (9) Lateral view of the inner side of the left fore tibia. (10) Lateral view of the ovipositor.



FIGS. 11–14.—Dorsal view of the left male cercus of (11) *Oxyecous lesnei* Chopard; (12) *O. apertus* sp. n.; (13) *O. magnus* sp. n.; (14) *O. undulatus* sp. n.

Measurements (*in millimetres*).

Males.—Total length (6): 45·1–49·3, mean 46·62; median length of pronotum (6): 6·6–7·0, mean 6·85; length of fore tibia (4): 6·2–8·0, mean 7·35; of hind femur (6): 21·4–25·1, mean 23·47; of fore wing (6): 32·1–37·2, mean 33·83; of exposed part of hind wing (5): 6·7–8·2, mean 7·34.

Females.—Total length (4): 32·8–34·3, mean 33·42; median length of pronotum (5): 5·6–6·4, mean 5·93; length of fore tibia (5): 7·7–9·1, mean 8·37; of hind femur (4): 20·3–22·7, mean 21·08; of fore wing (5): 24·8–27·2, mean 25·82; of exposed part of hind wing (3): 2·5–3·3, mean 2·90; of ovipositor (4): 8·0–8·7, mean 8·35.

Discussion.—The chief feature of interest in the male of this species is the curious operculum or " ear-flap " which is developed on the inner face of each fore tibia. The outward-facing side of this flap is strongly concave, and its general structure certainly suggests that its function is to concentrate sound

coming from a lateral source on to the inner tympanum of the fore tibia. This would mean that both the inner and outer tympana of each fore tibia would be most sensitive to sounds coming from one particular direction, i.e. from the side of the body to which the tibia is attached. Thus the left fore tibia would be most sensitive to sounds coming from the left, and the right fore tibia to sounds coming from the right. This would greatly facilitate a directional response to sound on the part of the insect, and it would be interesting to investigate this possibility experimentally. The operculum of the female of this species, of both sexes of the other members of the genus, and of many other Phaneropterinae,

15

16

FIGS. 15–16.—*Oxyecous lesnei* Chopard, male. (15) The base of the pre-anal part of the right fore wing. (16) Dorsal view of the stridulatory organ.

though much less well-developed, possibly also improves the ability of the insects to give a directional response to a source of sound such as a stridulating male.

Other diagnostic characters are provided in the male by the basal lobe of the left fore wing and the transparent areas of the right fore wing. A curious feature of this species is that, although the female has longer fore tibiae than the male, in almost all other respects this sex is the smaller of the two.

Material examined.—MOZAMBIQUE : Lower Zambesi (1 ♀). SOUTHERN RHODESIA : Salisbury distr., flying to light, 6.iv.1947 (*Whellan*) (1 ♂) ; Salisbury distr., Widdecombe Park, 14.iii.1948 (*Whellan*) (1 ♂) ; Salisbury distr., Hatfield, 27.iii.1953 (*Whellan*) (1 ♀) ; same locality, 28.ii.1952 (*Whellan*) (1 ♀) ; same locality, " fed on *Lantana camara* ", 27.ii.1953 (*Whellan*) (1 ♀) ; Salisbury, iv–v.1899 (*Marshall*) (2 ♂) ; Umtali, Xmas Pass, v.1932 (*Ogilvie*) (1 ♀). NORTHERN RHODESIA : 5–6 miles E. of Lusaka, iii–vi.1956 (*King*) (1 ♂). BELGIAN CONGO : Katanga (*Lemaire*) (1 ♂) (in the Musée Royal du Congo Belge).

In the British Museum (Natural History) unless otherwise stated.

Distribution.—The known distribution of this species is confined to Belgian Congo, Northern Rhodesia, Southern Rhodesia and Mozambique, but it doubtless also occurs in Nyasaland.

Oxyecous apertus sp. n.

Diagnosis. Male and *Female.*—Inner tympanum of fore tibiae open ; ventral operculum only slightly developed, as in fig. 3. Basal part of costal, radial, and anterior medial areas of right male fore wing relatively transparent with sparse venation. Male cerci as in fig. 12. Fore tibiae shorter than median length of pronotum.

Description. Male.—Fastigium of vertex moderately compressed, depressed apically, not or hardly sulcate above.

Pronotum hairy. Process of fore coxae lanceolate, as in fig. 18. Fore femora with about 4–6 internal spinules and sometimes one external spinule. Fore tibiae with open inner tympanum, its ventral operculum only slightly developed, when viewed laterally, as in fig. 3, and with about 5 external spurs. Mid femora with about 6–7 external spinules. Mid tibiae very distinctly swollen towards base, with about 8–10 external spurs. Hind femora with about 7–8 external spinules. Hind tibiae with about 25–35 external dorsal spines. R_1 of fore wings with at least two posterior branches ; M rather indistinct apically. Base of left fore wing without posterior lobe ; basal part of costal, radial, and anterior medial areas of right fore wing relatively transparent with sparse venation. Hind wings extending beyond fore wings by about fifth length of latter.

Tenth abdominal tergite slightly enlarged and emarginate medially. Supra-anal plate similar to fig. 20. Cerci as in fig. 12. Subgenital plate similar to fig. 21, but with lobes more widely separated.

Coloration probably green ; extent of maculation uncertain but probably more restricted than in *O. lesnei* Chopard. Femoral and tibial spines and spurs dark-tipped. Hind wings hyaline, exposed part translucent. Cerci with dark tip.

Female.—As male except for genitalia and in following respects: Pronotum almost glabrous. Venation of fore wings less distinct than in male ; costal, radial, and medial areas unmodified. Hind wings extending beyond fore wings by about eighth length of latter. Ovipositor similar to fig. 10, distal half of dorsal margin and distal quarter of ventral margin crenulate or denticulate.

Measurements (*in millimetres*).

Male.—Total length : 38·3 ; median length of pronotum : 7·6 ; length of fore tibia : 5·8 ; of hind femur : 17·7 ; of fore wing : 28·2 ; of exposed part of hind wing : 6·4.

Female.—Total length : 35·6 ; median length of pronotum : 7·3 ; length of fore tibia : 5·2 ; of hind femur : 19·4 ; of fore wing : 28·0 ; of exposed part of hind wing : 3·8 ; of ovipositor : 7·9.

Holotype ♂, KENYA : Rabai, iv.1928 (*van Someren*). In the British Museum (Natural History).

Discussion.—Both sexes of this species may be distinguished from the remainder of the genus by the shape of the inner tympanum of each fore tibia, when viewed laterally. The relative length of the fore tibia is much less than in *O. lesnei* Chopard and *O. magnus* sp. n., and the male may be diagnosed by the shape of the cerci. The female fore wings of *O. apertus* sp. n. are less translucent than those of the male, due to a denser archedictyon.

Material examined.—♂ holotype ; 1 ♀ paratype, KENYA : Rabai, i–ii.1929 (*Gedye*). In the British Museum (Natural History).

Distribution.—Known only from the type locality.

Oxyecous magnus sp. n.

Diagnosis. Male.—Large, total length about 50 mm. Cerci long and thick, shaped as in fig. 13. Inner tympanum of fore tibiae as in fig. 4, when viewed laterally.

Female unknown.

Description. Male.—Fastigium of vertex moderately compressed, depressed apically, hardly or slightly sulcate above.

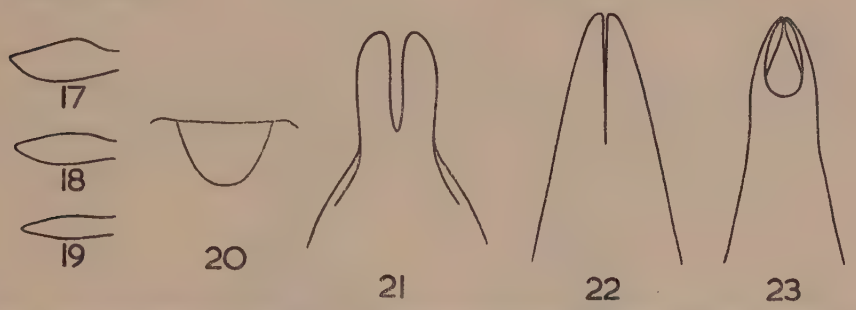
Pronotum almost glabrous. Process of fore coxae ensiform, as in fig. 19. Fore femora with about 4–7 internal and about 1–2 external spinules. Inner tympanum of fore tibiae

as in fig. 4, when viewed laterally ; fore tibiae with about 5–6 external spurs. Mid femora with about 7 external spinules. Mid tibiae distinctly swollen towards base, with about 10–11 external spurs. Hind femora with about 9–12 external spinules. Hind tibiae with about 20–35 external dorsal spines. R_1 of fore wings with at least two posterior branches ; M rather indistinct apically. Base of left fore wing without posterior lobe ; basal part of costal, radial and anterior medial areas of right fore wings of same texture as rest of wing, or nearly so. Hind wings extending beyond fore wings by about fifth or sixth length of latter.

Tenth abdominal tergite slightly enlarged and emarginate medially. Supra-anal plate similar to fig. 20, but relatively somewhat longer. Cerci long and thick, shaped as in fig. 13. Subgenital plate as in fig. 22, its lobes basally contiguous, or nearly so.

Coloration probably green ; extent of maculation uncertain, but probably very restricted. Femoral and tibial spines and spurs dark-tipped. Base of left fore wing with dark brown mark along region of Cu_1 and Cu_{1b}. Hind wings hyaline, exposed part translucent. Cerci with dark tip.

Female unknown.



Figs. 17–23.—*Oxyecous* Chopard. (17) Fore coxal process of *O. lesnei* Chopard. (18) The same of *O. apertus* sp. n. (19) The same of *O. magnus* sp. n. (*O. undulatus* sp. n. is very similar). (20) Dorsal view of the male supra-anal plate of *O. lesnei* Chopard. (21) Ventral view of the male subgenital plate of *O. lesnei* Chopard. (22) The same of *O. magnus* sp. n. (23) The same of *O. undulatus* sp. n.

Measurements (*in millimetres*).

Males.—Total length (2) : 50·3–51·4, mean 50·85 ; median length of pronotum (2) : 6·7–7·5, mean 7·15 ; length of fore tibia (2) : 7·7–7·9, mean 7·80 ; of hind femur (2) : 19·2–22·0, mean 20·60 ; of fore wing (2) : 37·8–38·2, mean 38·00 ; of exposed part of hind wing (2) : 5·7–8·0, mean 6·85.

Holotype ♂, Tanganyika : Kilosa, iii.1926 (*Miller*). In the British Museum (Natural History).

Variation.—It is clear from the two specimens available that there is much variation in the armature of the femora and tibiae. The cerci vary somewhat in shape, those of the paratype being appreciably narrower at the apex than those of the holotype (figured).

Discussion.—The male of this species may be diagnosed by its large size, and by the shape of the long, thick cerci.

Material examined.—♂ holotype ; 1 ♂ paratype, Belgian Congo : Kolwezi, at light, ii.1953 (*Gilbert*). In the Musée Royal du Congo Belge.

Distribution.—The two specimens available suggest a distribution covering parts of Tanganyika, Nyasaland, Northern Rhodesia and southern Belgian Congo.

Oxyecous undulatus sp. n.

Diagnosis. Male.—Cerci shaped as in fig. 14. Subgenital plate as in fig. 23. Venation of fore wings rather irregular; M, R_s, and branches of R_1, undulate and rather indefinite. Inner tympanum of fore tibiae as in fig. 5, when viewed laterally.

Female unknown (but see discussion below).

Description. Male.—Fastigium of vertex moderately compressed, depressed apically, not or hardly sulcate above.

Pronotum almost glabrous. Process of fore coxae ensiform, similar to fig. 19. Fore femora with about 2–3 internal and sometimes 1–2 external spinules. Inner tympanum of fore tibiae as in fig. 5, when viewed laterally; fore tibiae with about 5 external spurs. Mid femora with about 5–6 external spinules. Mid tibiae distinctly swollen towards base, with about 7–9 external spurs. Hind femora with about 4–6 external spinules. Hind tibiae with about 15–20 external dorsal spines. Venation of fore wings rather irregular; R_1 with two posterior branches; M, R_s, and branches of R_1, undulate and rather indefinite. Base of left fore wing without posterior lobe; basal part of costal, radial and anterior medial areas of right fore wing of almost same texture as rest of wing, or sometimes rather more transparent. Hind wings extending beyond fore wings by about quarter length of latter.

Tenth abdominal tergite not or hardly enlarged, slightly emarginate medially. Supra-anal plate similar to fig. 20. Cerci as in fig. 14. Subgenital plate as in fig. 23.

Coloration probably green, with red-brown spots on pronotum, thoracic pleura, parts of legs, and abdominal tergites. Femoral and tibial spines and spurs dark-tipped. Stridulatory organ brown. Hind wings hyaline, exposed part translucent. Cerci with dark tip.

Female unknown (but see discussion below).

Measurements (*in millimetres*).

Males.—Total length (2): 39·8–45·0, mean 42·40; median length of pronotum (3): 6·5–7·0, mean 6·78; length of fore tibia (2): 6·1–6·4, mean 6·25; of hind femur (1): 18·2; of fore wing (3): 29·8–35·1, mean 32·03; of exposed part of hind wing (1): 7·1.

Holotype ♂, Uganda: Bugoma Forest, 14.vi.1933 (*Johnston*). In the British Museum (Natural History).

Variation.—The fastigium of the vertex may or may not be slightly sulcate. There is much variation in the armature of the femora and tibiae. The venation of the fore wings is very variable.

Discussion.—The male of this species may be recognised by the shape of the cerci and subgenital plate.

A female specimen from Northern Rhodesia may belong to this species, but its lack of both fore and hind legs makes a definite diagnosis impossible. The venation of the fore wings is very irregular, the course of the media being particularly indefinite. This specimen measures 44·7 mm. in total length and the length of the ovipositor is 8·0 mm.

Material examined.—♂ holotype; Tanganyika: Old Shinyanga, Boma, 28.iv.1935 (*Burtt*) (1 ♂); ——, iii.1914 (1 ♂). ? Northern Rhodesia: Ngoa, 1912 (*Lloyd*) (1♀).

All in the British Museum (Natural History).

Distribution.—The range of this species doubtless covers most of East Africa.

Reference.

Ragge, D. R., 1955, *The wing-venation of the Orthoptera Saltatoria.* London, British Museum (Natural History).

NEUE CETONIDEN, TRICHIIDEN UND VALGIDEN AUS DEM CORYNDON MUSEUM IN NAIROBI (COLEOPTERA: LAMELLICORNIA).

VON HANS SCHEIN.
(*in München.*)

In einer sehr interessanten Bestimmungssendung des Coryndon Museums in Nairobi, für die ich Mr. A. F. J. Gedye bestens danke, fanden sich einige neue Arten, die ich hier beschreibe. Alle Typen befinden sich im Coryndon Museum. Grössenangaben im Text sind ohne Kopf zu verstehen.

Pachnoda gedyei sp. n.

Länge 16 mm., Breite an den Schultern 9 mm.

♂. Kleine, glänzend schwarze, gelbefleckte *Pachnoda* aus der Verwandtschaft der *bella* Kr. und *säuberlichi* Hauser, die sich von diesen durch die ganz schwarz gefärbte hintere Hälfte der Flügeldecken unterscheidet.

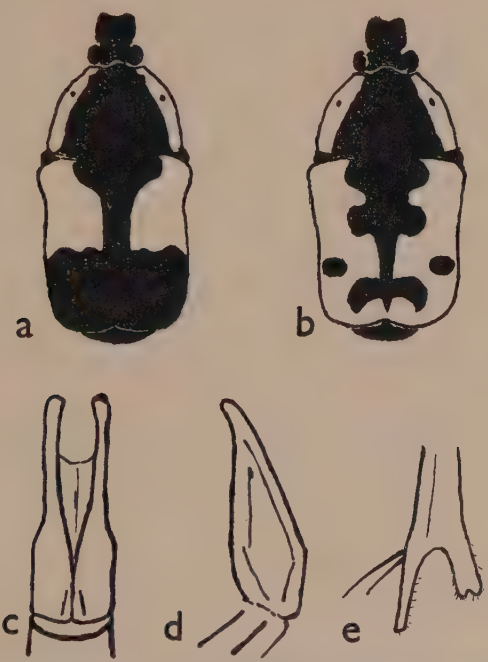


FIG. 1.—(*a*) *Pachnoda gedyei* sp. n. (*b*) *P. säuberlichi* Hauser. (*c–d*) *P. gedyei*, Parameren des Forceps. (*c*) van oben, (*d*) im Profil. (*e*) *Calometopus nigerrimus* sp. n. Ende der linken Hinterschiene.

Es genügt, die Unterschiede gegenüber der *säuberlichi* hervorzuheben, mit der sie Form Skulptierung und Bau der Parameren des Forceps gemeinsam hat; wenn man zur Zusammenführung näherer Verwandschaften den Begriff der Gross-Art einführen wird,

wird sie mit *säuberlichi* und *bella* eine solche zu bilden haben. Fühlerfächer braun, dort schwarz. Die Abweichung der Zeichnung wolle der beigegebenen Skizze entnommen werden. Die Punktierung ist etwas feiner, in der Anlage gleich. Das schwarze Pygidium zeigt je 1 kleinen, runden, weissen Fleck in den Basalecken, der in einem Grübchen liegt; die seitlichen Eindrücke sind etwas grösser und quergestrichelt, dort nur kräftig punktiert. Die Behaarung der Vorderhüften und Schenkel ist goldgelb, dort heller. Der Brustfortsatz ist flacher, eine querovale Platte, während er dort mässig gewölbt ist.

Die beulenartige Erhöhung des Halsschildvorderrandes und die tiefe Bauchfurche des ♂ über die Segmente 2 bis 5 ist allen 3 Arten gemeinsam, wie auch die 3-zähnigen Vorderschienen.

Heimat: Kenya Colony: Kanziko bei Kisumu (Viktoria See).

Micrelaphinis etiopica sp. n.

Länge 10 mm., Breite an den Schultern 5 mm.

Kleine, oben bei ♂♀ matte, braune, schwarzgrün marmorierte und besonders auf dem Halsschild unregelmässig fein weiss getupfte *Micrelaphinis* mit breitem Schildchen und bei ♂♀ 2-zähnigen Vorderschienen.

Kopf wie bei *irrorata* F. geformt, grünlich-kupfrig glänzend, mit Stirnschwiele, ziemlich grob punktiert.

Halsschild breiter als lang, hinten in breitem Bogen abgerundet, doch in der Mitte über dem Schildchen flach ausgeschnitten, mit sehr stumpfen Hinterecken, von diesen nach vorn zunächst schwach, im letzten Drittel stärker bogig verengt; Vorderrand in der Mitte in eine stumpfe, beim ♀ stärkere Beule erhoben. Scheibe mässig, zur Beule stärker gewölbt. Seiten mit feiner Randleiste. Matt, braun und grün gescheckt, hinten und in der Mitte überwiegt die braune, sonst die grüne Farbe. Mit etwa 30 unregelmässig verteilten, weisslichen Fleckchen, die an den Seiten stellenweise zu einer Randbinde zusammenfliessen. Ohne erkennbare Punktierung.

Schildchen ein gleichschenkliges, fast gleichseitiges Dreieck mit stumpfem Scheitel; Seiten nicht eingebogen. Überwiegend braun. Die sichtbaren Epimeren gross, braun.

Flügeldecken breiter als der Halsschild, unter den Schultern ausgeschnitten, dann nach hinten wenig verengt, mit rechtwinkligen Nahtecken, Nahtende etwas erhoben. Jede Decke mit 3 Rippen, die von Reihen länglicher Strichel eingefasst sind; auf den abfallenden Seiten ist eine weniger hohe Rippe zu erkennen. Die Decken sind beim ♂ überwiegend braun, beim ♀ ist die schwarzgrüne Marmorierung stärker. Weisse Flecken ganz wenig, die gar nicht auffallen.

Pygidium matt, braunschwarz, mit einigen rotbraunen Fleckchen und etwa einem Dutzend längs der Basis und quer über die Mitte verteilten, weisslichen Punkten.

Unterseite glänzend schwarz, auf der Brust mit Kupferschimmer. Brustfortsatz kegelförmig mit verrundeter Spitze, schräg nach unten zeigend. ♂ ohne Bauchfurche. Vorderhüften und Schenkel gelbbraun behaart, Mittel-und Hinterschienen mit langen, sehr dünn stehenden, gelben Fransenhaaren.

Vorderschienen bei ♂♀ mit 2 Zähnen, die anderen aussen mit Kerbe. Hinterschienen mit je 2 ungleichen Sporen, die beim ♂ spitzig, beim ♀ breiter, etwas ausgehöhlt und am Ende abgerundet sind. Tarsen schlank, beim ♂ etwas länger als die Schienen, beim ♀ etwa gleichlang. Erstes Tarsenglied nur beim ♀ dornig.

Etwas gedrungener gebaut als die anderen Arten mit gleicher Schienenzähnung und besonders durch Schildchen und Brustfortsatz verschieden. Am meisten ähnlich ist *Elaphinis patrizii* Bourgoin, hat aber einen gelben, nicht metallisch glänzenden Kopf und einen spitzigen, rotgefärbten Brustfortsatz.

Heimat: Abessinien: Lower Tana-Sabaki, iv–v. 1932 (*Turner* und *MacArthur*).

Somalibia bimaculata sp. n.

Länge 13 mm., Breite an den Schultern 7 mm.

Glänzend schwarze *Somalibia* mit je einem grossen weissen Fleck hinter der Mitte jeder Decke und mit herabhängendem Brustfortsatz.

Diese und die folgende Art fallen dadurch aus dem Rahmen der *Somalibia*, dass der Brustfortsatz herabhängt. Die Errichtung einer neuen Gattung ist aus diesem Grund noch nicht veranlasst, wie man bisher auch bei *Alleucosma* wegen des bei einem Teil der Arten herabhängenden, bei den anderen Arten flachen Brustfortsatzes die Gattung nicht getrennt hat.

Kopfschild etwas länger als breit, mit flach gebogenen Seiten und vorn in 2 Lappen aufgebogenem Vorderrand. Scheibe leicht vertieft. Stirn mit kurzem, glattem Längskiel, sonst ist der Kopf runzligkörnig.

Halsschild hinten in flachem Bogen abgeschnitten, der über dem Schildchen flach ausgerandet ist und in die Rundung der Seiten übergeht, sodass die Hinterecken kaum bemerkbar sind. Seiten nach vorn gleichmässig bogig verschmälert. In der vorderen Hälfte der stark gewölbten Scheibe in der Mittellinie ein bis zum Rand ausgedehnter, glatter Kiel. Scheibe mit Ausnahme der über dem Schildchen liegenden Teile sonst stark punktiert.

Schildchen gross, stumpf, etwas schmäler als lang, glatt, mit flach eingedrückter Mittellinie.

Epimeren gross, grob punktiert.

Flügeldecken breiter als der Halsschild, $1\frac{1}{3}$ mal so lang als breit, unter den Schultern ausgeschnitten, im letzten Drittel wieder fast so breit wie an den Schultern, am Apex gemeinsam abgerundet, mit sehr kurz vorstehender, etwas erhobener Nahtspitze. Gewölbt, mit kielförmiger Naht und etwa 8 vorn deutlicheren groben Punktreihen, die hinten feiner und unregelmässig werden ; die Schulterrippe und eine Rippe auf der Scheibe sind nur sehr schwach erhöht. Das mittlere Drittel jeder Decke wird von einem grossen, weissen, rötlich schimmernden Fleck eingenommen, der dem sehr schmal schwarz bleibenden Seitenrand breit anliegt und sich zur Naht in unregelmässiger, fein gezackter Linie verengt ; er endet kurz nach Überquerung der mittleren Rippe.

Pygidium in sanfter Wölbung abfallend, stark gerunzelt. Vorderhüften, Schenkel und Schienen mit dünn stehenden, langen, gelbgrauen Haaren, Mittel-und Hinterschienen mit solcher Franse und zerstreuten, hellen Börstchen.

Brustfortsatz stumpf kegelförmig, im Endteil herabhängend. Brust und Hüften quergestrichelt, Abdominalsegmente sehr glatt, nur mit einer feinen Punktreihe.

Vorderschienen mit 2 starken, spitzen Zähnen, Mittel-und Hinterschienen mit schwacher Kerbe im Endteil. Hinterschienen mit ungleichen, breiten, vorn abgerundeten Sporen (♀). Tarsen etwas kürzer als die Schienen. Erstes Tarsenglied dornig (♀).

Durch Farbe und Grösse von den anderen Arten verschieden.

Heimat : SOMALILAND : Wardere, v. 1944 (*T. H. E. Jackson*).

Somalibia sternalis sp. n.

Länge 9–10 mm., Breite an den Schultern 5·5–6 mm.

Glänzend schwarze *Somalibia* mit rotbraunen Flügeldecken und gelbweissen Randbinden auf Halsschild und Flügeldecken, die auf diesen oft in Flecken aufgelöst sind und immer einen Ast in die Nähe der mittleren Naht entsendem ; mit spitzkegelförmigem, stark herabhängendem Brustfortsatz.

Kopfschild wie bei der vorigen Art, die aufgebogenen Lappen etwas zipfelförmig. Kopf stark gerunzelt. Fühler rotbraun, 1. Glied schwarz. Halsschild wie beim vorigen geformt, schwarz mit gelbweissen Binden längs der Seiten ; der Kiel vorne stark, Scheibe sehr grob punktiert, nur in der rötlich schimmernden Gegend über dem Schildchen und auf der Mittellinie glatt.

Schildchen wie bei der vorigen Art.

Die rotbraunen Flügeldecken unterscheiden sich von der vorigen Art dadurch, dass die Naht und 2 Rippen auf jeder Decke viel stärker erhoben sind; dazwischen laufen wie auch auf den abfallenden Seiten deutliche Punktreihen. Die Apikalgegend ist manchmal angedunkelt. Die gelbweisse Umrandung reicht bald ohne Unterbrechung vom Seitenausschnitt bis zum Nahtende, bald ist sie in unregelmässige Flecken aufgelöst; der hinter der Mitte zur Naht abzweigende Arm der Randbinde ist bald breit, bald schmäler, unregelmässig gerandet, doch stets nach innen schmäler werdend.

Pygidium schwarz mit 2 weissen, runden Fleckchen in den Basalecken. Unterseite schwarz, Behaarung der Vorderhüften, Brust, Schenkel und der Schienenfransen gelblich.

Brustfortsatz spitziger kegelförmig als beim vorigen, senkrecht herabhängend.

Vorderschienen mit 2 grossen, sehr spitzen Zähnen. Sporen der Hinterschienen ungleich, beide dick (♀). Hintertarsen kürzer als die Schienen (♀). Erstes Glied der Hintertarsen deutlich dornig (♀). Durch den herabhängenden Brustfortsatz von den anderen kleinen Arten verschieden.

Heimat: Somaliland: Rocca Littorale, x–xi, 1943; Wardere, x. beide ♀ (*T. H. E. Jackson*).

Alleucosma rubidocincta sp. n.

Länge 18 mm., Breite an den Schultern 10 mm.

Oben matte, unten glänzende, dunkel grüne, oben rot umrandete, fein weiss getupfte *Alleucosma*, unten stark gelbweiss gefleckt, mit plattenförmig erweitertem, querovalem, nicht herabhängendem Brustfortsatz, bisher grösste Art.

Alleucosma zerfällt in 2 durch die Form des Brustfortsatzes getrennte Gruppen; bei der einen hängt er kegelförmig herab, bei der anderen ist er eingeschnürt und dann plattenförmig verbreitert, nicht herabhängend. Zu letzterer Gruppe (*bourgoini* Burgeon, *duvivieri* v.d. Poll, *flavosignata* Mos., *insularis* Mos., *kamerunensis* Mos., *maritimi* Mos., *pulchra* Mos. und *uelensis* Burgeon) gehört als grösste Art *rubidocincta*.

Schwarz sind der Vorderrand des Kopfschildes, die Fühler, Vorderschenkel und alle Tarsen, sonst ist die Farbe dunkelgrün; der Halsschild ist ringsum dunkelrot gerandet, mit rot durchscheinender Mittellinie, mit 4 im Trapez angeordneten weissen Punktflecken, über jedem der beiden hinteren weissen Flecken eine kleine, runde, rot durchscheinende Stelle. Die grünen Epimeren hinten aussen gelbweiss gefleckt. Der dunkelrote Rand der Flügeldecken bedeckt den ganzen Seitenrand und endet am Apikalrand kurz vor der Naht. Gelbweisse Punktflecken stehen: je 1 beiderseits der Schildchenspitze, je 1 auf der Scheibe kurz unterhalb der Mitte, je 1 im Nahtwinkel, 6 -dazwischen winzige Spritzer-längs der Aussenränder. Pygidium grün mit einem grossen, runden, fast die ganze Scheibe einnehmenden roten Fleck und je 1 weissem Fleck in den Basalecken. Auf der glänzendgrünen Unterseite finden sich matte, hellgelbe Tomentflecken: je 1 auf jeder Seite der Vorderhüften, je 1 auf den umgeschlagenen Seiten des Halsschildes, je 2 sehr lange auf dem Vorder-und Hinterrand der Brust, die auf die Seitenteile sich fortsetzen, je 1 auf den Schenkeldecken mit den daneben liegenden Seitenteilen, je 1 sehr langer auf den vorderen Rändern der Ringe 2–4, der vom Seitenrand entfernt steht, und je 1 an den hinteren Rändern der Ringe 1–3, der an den Seitenrand anstösst und kürzer ist. Die Mitte des letzten Segmentes mit grossem, rotem Fleck. An den Mittel-und Hinterschienen sind Knie und Apex geschwärzt.

Kopfschild so lang als breit, mit flach gerundeten Seiten, vorn mit 2 halbrunden Lappen, nicht aufgebogen, in der Mitte gewölbt, der schwarze Teil glänzend.

Halsschild hinten am breitesten, Hinterrand ein flacher Bogen, über dem Schildchen sehr flach gebuchtet. Seiten im vorderen Drittel stärker verengt. Ohne scharfe Ecken.

Schildchen ein gleichschenkliges, fast gleichseitiges Dreieck mit geraden Seiten.

Flügeldecken an den Schultern breiter als der Halsschild, $1\frac{1}{2}$ mal so lang als dort breit,

nur mässig nach hinten verschmälert. Decken einzeln abgerundet, ohne Nahtspitze. Ohne Rippen. Punktierung durch das Toment verdeckt.

Pygidium in sanfter Wölbung fast senkrecht abfallend.

Vorderhüften, Schenkel und Schienen goldgelb beborstet. Brustfortsatz durch Naht an der engsten Stelle abgesetzt, aber im verbreiterten, ovalen, sehr glatten Endteil ohne beborstete Quernaht. Brust in der Mitte fein, seitlich stark, stellenweise strichelig punktiert. Bauchringe mit feinen, hell beborsteten Punktreihen. Vorderschienen mit 2 grösseren Zähnen und 1 sehr kleinen, aber deutlichen Zahn. Mittel-und Hinterschienen mit starker Kerbe. Diese mit 2 spitzen Sporen. Tarsen nicht länger als die Schienen, erstes Glied der Hintertarsen nicht dornig ausgezogen.

Von den anderen Arten schon durch die Grösse verschieden.

Heimat: Tanganjikaland: Amani in den Bergen von Usambara.

Discopeltis machulkai Knirsch **nigerrima** subsp. n.

Von der Nominatform dadurch verschieden, dass die gelbrote Farbe, die dort fast die ganze Scheibe der Flügeldecken bedeckt, ganz fehlt. Die weissen Fleckchen sind dagegen wie dort vorhanden. 1 ♂ und 3 ♀ im April, 1952, von T. H. E. Jackson mit der Nominatform gefangen.

Heimat: Kenya Colony: Kacheliba am Swam River nordöstlich des Mt. Elgon.

Discopeltis varicolor sp. n.

Länge ohne Kopf und Pygidium 14 mm., Breite an den Schultern 8 mm.

Am Halsschild und den Flügeldecken matte, sonst glänzende, schwarze *Discopeltis* mit roten Halsschildseiten und roten Längsbinden auf der Scheibe der Flügeldecken, die im vorderen Drittel durch eine schmale, in der Mitte durch eine breitere schwarze, blaugrün bereifte Querbinde unterbrochen werden, und mit einigen weissen, blaugrün schimmernden Punktflecken.

Kopf wie bei *variabilis* Mos., vorn glatt, sonst grob punktiert. Die rote Randbinde des Halsschildes ist vorn breiter, beginnt in den Vorderecken und läuft an der Basis noch eine kurze Strecke am Hinterrand entlang. Von weissen, opalisierenden Fleckchen stehen je 2 in jeder Randbinde, je 5–6 kleine, runde auf jeder Seite der Scheibe und 2 strichförmige auf dem hinteren Teil der Mittellinie.

Das schmale, schwarze Schildchen ist von schmalen, weissen, opalisierenden Linien im Spitzenteil eingefasst.

Die roten Binden der Flügeldecken reichen weder bis zur Naht, noch bis zum Seitenrand, die schwarz bleiben; sie werden in der Schildchengegend dadurch schmäler, dass dort der schmale, schwarze Nahtstreifen in Richtung auf die Halsschildhinterecken erweitert ist. Hinten enden die Binden kurz oberhalb der Apikalbeulen, auch hier ist der schwarze Nahtstreif verbreitert. Die schwarzen Stellen der Scheibe, insbesondere die schwarzen Unterbrechungen der roten Binden, zeigen reifartige, blaugrün opalisierende, unregelmässige Fleckchen. 4 Doppelreihen eingedrückter Längrisse sind auf jeder Decke zu zählen.

Mitte des Pygidiums mit grossem, rotem Fleck. Ausserdem 4 der Quere nach angeordnete, weissliche, opalisierende Fleckchen. Das ganze Pygidium fein punktiert und stellenweise gestrichelt, glänzend. Beborstung und Behaarung der Vorderhüften, Brust, Beine und Bauchringe weisslich. Bei einem Exemplar sind die Hinterränder der Segmente 2–4 opalweiss gefleckt.

Brustfortsatz walzenförmig, ohne beborstete Quernaht.

Vorderschienen an Stelle eines Seitenzahnes mit schwacher, wellenartiger Verbreiterung.

Die neue Form kommt nur der aus Usambara beschriebenen *variabilis* Moser nahe und kann vielleicht als deren subspecies aufgefasst werden; leider hatte ich zu wenig

Material, um die Parameren des Forceps vergleichen zu können. Der Unterschied in der Grösse spricht aber für Artrang. Moser erwähnt zwar auch grössere Stücke, die allerdings kleiner sein dürften als die vorliegenden *varicolor*, da er Kopf und Pygidium mitmisst.

Heimat: Kenya Colony: Wandanyi südöstlich Voi, 5000 Fuss hoch. 2 ♂, iii. 1939.

Leptothyrea sexualis sp. n.

Durch nicht verkürzte mittlere Rippe der Flügeldecken und sexuell differenzierte Färbung gekennzeichnete *Leptothyrea*.

Länge 10–11 mm., Breite an den Schultern 5–6 mm.

Glänzend schwarz, die ganzen Fühler, das Pygidium und das letzte, beim ♀ auch das vorletzte Abdominalsegment orangerot.

♂. Halsschild schwarz oder rot, immer mit weisser Seitenrandbinde, meist mit 2 weissen, vertieften runden Fleckchen über der Basis. Auch die Flügeldecken zeigen eine von der Schulterbeule bis zur Naht ziehende, weisse, meist in 4–6 unregelmässige Flecken zerrissene Randbinde und je 2 parallel zur Naht laufende, aus schmalen Strichen und Punkten zusammengesetzte, unregelmässig unterbrochene, weisse Längsbinden auf der Scheibe. Das Pygidium trägt 2 längliche, dachartig angeordnete weisse Flecken, die oft in 4 Flecken aufgelöst sind. Weisse Flecken stehen auch auf den oben sichtbaren Epimeren, den Seiten und Seitenstücken der Brust und meist den Seiten der Bauchringe 2–5.

♀. Halsschild stets rot, ohne weisse Flecken, auch die Flügeldecken sind ungefleckt oder tragen nur geringe Spuren der beim ♂ vorhandenen weissen Binden; im Nahtwinkel fast immer ein weisser Fleck. Pygidium und Unterseite nicht gefleckt.

Kopfschild so lang als breit, seitlich und vorn aufgebogen, der aufgebogene Teil ausgerandet, sodass 2 flache Lappen entstehen. Der Raum in den Vorderecken etwas vertieft. Der ganze Kopf mässig stark punktiert. Fühlerfächer etwas länger als der Stiel. Halsschild ungefähr so lang als breit, über dem Schildchen fast gerade, nur ganz schwach gebuchtet, daneben abgeschrägt, mit sehr stumpfen Hinterecken. Seiten bis zur Mitte parallel, dann stark nach vorn verengt. Überall mässig dicht punktiert.

Schildchen länger als breit (breiter als bei *Leucocelis*), mit schwach eingebogenen Seiten und nicht scharfer Spitze. Flügeldecken kaum nach hinten verschmälert. Die ganze Naht rippenartig erhöht, mit hoher Rippe zwischen Schulter-und Apikalbeule, die sich vor ersterer gabelt; zwischen dieser Rippe und der Naht eine weitere, vollständige, gleichhöhe Rippe, die sich auf der Apikalbeule mit der Seitenrippe vereinigt. Naht und Rippen glatt, in den Zwischenräumen je 2 feine Doppelrisse; mehrere solche auch auf den abfallenden Seiten. Nahtende etwas ausgezogen.

Das rote Pygidium mit unregelmässig verteilten, ovalen Ringpunkten. Vorderhüften und Brustseiten weisslich behaart. Brustfortsatz zwischen den Hüften eingeschnürt, vorn in eine quere, hammerartige Platte (wie bei *L. sticticollis* Kr.) erweitert, die fast geradlinig abgestutzt ist. Keine beborstete Quernaht. Brust glatt, in der Mitte mit Rille, die Seiten gestrichelt, besonders die Schenkeldecken. Bauchringe weitläufig punktiert, an den Seiten fein weiss behaart. ♂ ohne Bauchfurche.

Vorderschienen an Stelle des Seitenzahnes beim ♂ stumpf verbreitert, beim ♀ mit scharfem, starkem Seitenzahn. Mittel-und Hinterschienen mit Kerbe. Sporen der Hinterschienen beim ♂ ungleich und spitzig, der längere sanft gebogen; beim ♀ sind beide breiter und am Ende abgerundet. Tarsen schlank, Hintertarsen beim ♂ so lang wie die Schienen, beim ♀ etwas kürzer. Ihr erstes Glied nicht dornförmig (bei ♂♀).

Die bekannten *Leptothyrea* sind wenig ähnlich und schon durch die verkürzte mittlere Rippe zu unterscheiden (*perroudi* Schaum, *sticticollis* Kr. und *massarti* Burg.). Das ♂ sieht in der Farbe sehr der von P. Preiss abgebildeten (1902, *Jb. nassau. Ver. Naturk.* 55: 105) *Erlangeria schoana* Preiss ähnlich, die aber einen anderen Kopf, ein rotes Schildchen und 3-zähnige Vorderschienen hat. Das ♀ sieht dem *Leucochilus notaticollis* Kr. so ähnlich, dass ich mir vom Deutschen Entomologischen Institut dessen Type erbat; ich

danke auch an dieser Stelle Direktor Professor Dr. H. Sachtleben in Berlin bestens für diese Hilfe. Diese Art hat einen nicht eingeschnürten Brustfortsatz, an dem sie sofort zu unterscheiden ist.

Heimat: Somaliland: Wardere, v. 1944 (*T. H. E. Jackson*).

Calometopus nigerrimus sp. n.

Länge 17 mm., grösste Breite unter den Schultern 8 mm.

♀. Durch glänzend tiefschwarze Farbe gekennzeichneter *Calometopus*. Pechschwarz ist der Fühlerfächer, gelbbraun sind die Lippentaster, weiss sind kleine, kurze Borstenbüschel an den Seitenrändern der Segmente 1–3 neben den Stigmen und am Hinterrand des Propygidiums; weissgraue, dünne Haare stehen an Vorderhüften und Brustseiten, weissliche, kleine Börstchen auf Abdomen und Beinen. Kopfschild breiter als lang, mit geraden Seiten; Vorderrand mit 2 Lappen, die aufgebogen sind. Stirn mit Schwiele, daneben Grübchen. Runzlig punktiert. Fühlerfächer (♀) etwas länger als der Stiel.

Halsschild länger als breit, hinten im Bogen abgeschnitten, ohne Ausrandung über dem Schildchen, mit scharf-rechtwinkligen Hinterecken, am Ende des vorderen Drittels am breitesten, zwischen Vorder-und Hinterrand S-förmig geschwungen. Weitläufig punktiert. Schildchen länglich-spitzbogig.

Flügeldecken unterhalb der Schultern am breitesten und dort beträchtlich breiter als der Halsschild, etwas nach hinten verengt, hinten dachförmig abgestutzt, Nahtende kurz, aber spitzig. Schildchengegend beulig aufgetrieben. Naht kielartig. Auf der Scheibe 7 etwas unregelmässige Punktreihen, die Zwischenräume schwach gewölbt. Schulterrippe sehr betont, daneben fallen die Seiten steil ab.

Rand des Abdomens von den Flügeldecken nicht bedeckt, ebenso ein Teil des Propygidiums. Pygidium sanft gewölbt, gross, schräg nach hinten abfallend.

Vorderschienen 3-zähnig, die beiden apikalen Zähne stehen nahe beisammen. Mittelschienen nicht gebogen (♀). Tarsen lang und dünn, länger als die Schienen (Hintertarsen fehlen!). Vorderschienen mit 1, die anderen mit 2 spitzigen, in der Länge nicht sehr verschiedenen Sporen. Mit sehr charakteristischer Fingerung des apikalen Endes der Hinterschienen (siehe Abbildung). Von allen bekannten *Calometopus* durch die Farbe verschieden und, wie die abweichende Fingerung der Hinterschienen beweist, nicht etwa eine melanistische Form einer bekannten Art.

Heimat: Kenya Colony: Nairobi, 1 ♀.

Comythovalgus kenyensis sp. n.

Länge 5·5 mm., Breite an den Schultern 4–4·5 mm.

Comythovalgus aus der Verwandtschaft des *kilimanus* Kolbe, durch braune Beine und dunkleres ♀ verschieden.

Körperform und Farbe des ♂ sehr ähnlich dem *C. kilimanus* Kolbe, vom Kilimandjaro, der aber schwarze Beine hat. Kopf, Halsschild, Schildchen und Flügeldecken auf braunem Grund stellenweise heller gelb, stellenweise dunkler beschuppt, Pygidium und Propygidium mit geschlossener, ockergelber Schuppendecke. Beim ♂ steht ein kurzer Streif hellerer Schuppen parallel zu den Seiten des Schildchens, auch zwischen den Apikalbeulen sind die Schuppen heller. Kurz vor der Mitte stehen in einer Querreihe 4 kurze schwarze Längsstrichlein. Borstenbüschel stehen 1 auf dem Scheitel, je 3 beiderseits der Mittellinie des Halsschildes, je 2 an dessen Seiten, auf die Lücken der Mittelreihe gedeckt; sie sind gelb wie dessen Schuppen, nur die 2 grössten Büschel in der Mitte des Hinterrandes sind dunkler und bräunlich. Auf den Flügeldecken stehen Borstenbüschel auf den Schultern und Apikalbeulen, je 1 auf der Scheibe zwischen diesen, und je 1 in den Nahtecken; diese sind grösser und heller als die anderen. Auf dem Propygidium stehen 2 grössere Büschel in einer Reihe, auf dem Pygidium 2 kleinere. Alle sind hellgelb. Beim ♀ ist der Grund schwarz-

braun bis schwarz, Schuppen und Borstenbüschel sind fast einfarbig dunkelbraun. Fühler schwarz. Beine braun, mässig dicht hell beschuppt; die 2 schrägen Querleisten der Hinterschienen stark beborstet, sodass der Eindruck zweier Zähne entsteht.

Vorderschienen des ♂ mit 3 grossen Zähnen und in ihren Lücken je 1 kleinen Zahn, hinter dem hintersten Zahn befindet sich eine fast zahnartige Ecke. Vom grossen Mittelzahn bis zu dieser Ecke sind die Schienen sehr breit. Vordertarsen schlank, ungefähr so lang wie die Schienen, Mittel-und Hintertarsen dünn und fast doppelt so lang wie die Schienen. Vorderschienen des ♀ nur mit 3 kräftigen Zähnen, Tarsen kürzer, Mittel-und Hintertarsen $1\frac{1}{2}$ mal so lang als die Schienen.

Die bekannten ost-und südafrikanischen *Comythovalgus*-Arten sind durch geringere Grösse verschieden, nur *kilimanus* Klb. ist gleichgross; sein ♂ hat schwarze Beine, sein ♀ kenne ich nicht.

Heimat: Kenya Colony: Chyulu-Berge, Sultan Hamud 4–5000 Fuss hoch, Nairobi, Limuru, Kijabe, Naiwasha, Naro Moru, Londiani, Elburgon, iii. bis vii.

Comythovalgus gedyei sp. n.

Länge 4·5 mm., Breite an den Schultern 3·5 mm.

Durch starken Kontrast zwischen schwarz und weiss in der Färbung gekennzeichnete *Comythovalgus*-Art. Beide Geschlechter ähnlich. Körperform wie bei den anderen Arten, Halsschild schmäler als die Flügeldecken.

Grundfarbe schwarz, an Schienen und Tarsen braun. Kopf, Halsschild und Flügeldecken überwiegend schwarz. Gelblichweisse Schuppen finden sich nur zwischen den Borstenbüscheln des Halsschildes, in je 2 kurzen Längsstrichen an der Basis der Flügeldecken beiderseits des Schildchens und in je 1 runden Fleck in den Nahtecken. Bräunlich beschuppt ist das Schildchen und das innere Drittel der Scheibe oberhalb des Niveaus der Apikalbeulen und die Stirn. Milchweiss gefärbt sind die Epimeren, das Propygidium, Pygidium, Unterseite und Beine, ausgenommen Vorderbeine und alle Tarsen. Auf dem Halsschild stehen an Schuppenbüscheln je 3 beiderseits der Mittellinie und je 2 am Seitenrand, die auf die Lücken der ersteren eingedeckt sind. Die vordersten und die seitlichen Büschel sind bräunlich, die 4 mittleren dunkler, fast schwarz. Die mittleren Büschel sind stärker entwickelt, stossen oft zusammen und wirken dann wie ein einziger, grosser Schopf. Auf den Flügeldecken stehen reinschwarze, schwächere Büschel auf den 4 Beulen und ein kleineres fast in der Mitte der Scheibe jeder Decke. 2 starke Büschel in den Nahtecken sind bräunlich. Die 2 Büschel des Propygidiums und die darunter stehenden, schwächeren Büschel des Pygidiums sind rahmweiss wie ihre Umgebung. Fühler rotbraun. Die Vorderschienen des ♂ zeigen 3 grosse und dazwischen 2 kleine Zähne, hinter dem der Basis nächsten Zahn eine niedrige Ecke. Der dritte Zahn ist der längste, von ihm an bis zur Ecke ist die Schiene etwas verbreitert. Beim ♀ besitzen die Vorderschienen nur 3 kräftige Zähne. Die Mittel-und Hintertarsen des ♂ sind fast doppelt so lang wie die Schienen, beim ♀ sind sie etwas kürzer. Durch die auffallende Färbung ist die neue Art leicht von den anderen Arten zu unterscheiden.

Heimat: Kenya Colony: Kitui (Mwingi), Sultan Hamud, Karura Forest, Naro Moru, iii bis vi.

Comythovalgus modestus sp. n.

Länge 4–5 mm., Breite an den Schultern 3–3·5 mm.

Kleine fast einfarbige braune Art.

Form wie bei den anderen Arten. Beide Geschlechter ähnlich gefärbt.

Grundfarbe pechschwarz, Beschuppung oben und unten in braunen Tönen, meist auf dem Propygidium und Pygidium un einen Ton heller. Schuppen dicht, aber stellen-

weise den Grund nicht verdeckend. Meist ist in der Mitte beiderseits der Naht je 1 kleiner schwarzer Fleck zu sehen. Die Borstenbüschel sind wie bei den vorhergehenden Arten verteilt, mässig gross und wie die Schuppen gefärbt ; wenn sie eng beieinander liegen, wirken sie schwärzlich. Fühler braun.

Zähnung der Vorderschienen wie bei *gedyei*, ebenso Länge der Tarsen. An der Einfarbigkeit kenntlich ; *aemulus* Kolbe ist, wenn er einfarbig ist, hellbraun.

Heimat : Kenya Colony : Shimba-Berge, Ngong, Naro Moru, Kijabe, Londiani von iii bis v.

Book Notices.

Taxonomist's glossary of genitalia in insects. Edited by S. L. Tuxen. 8vo. Copenhagen (Munksgaard). 1956. Pp. 284, text illust. Price D. kr. 80.

This work is the outcome of a proposal made by the editor at the International Congress of Entomology held in Amsterdam in 1951. It is intended as an aid to the amateur entomologist in identifying insects and to the professional entomologist, who may be called upon to determine insects in groups with which he is not familiar.

The volume is in two parts. In Part I each of the 29 orders of insects is dealt with separately by a specialist. The male and female genital apparatus of each order is described and illustrated. A short bibliography of the most important papers is given at the end of each chapter.

Part II comprises a Glossary where the terms (more than 4000) are listed in alphabetical order, with references, definitions and synonyms, including also, in abbreviated form, references to the figures in Part I.

Atlas des larves d'insectes de France. By R. Paulian. 8vo. Paris (Editions N. Boubée). 1956. Pp. 222, text illust. [*Nouvel Atlas d'Entomologie* No. 10.] Price 1800 Frs.

This work opens with an introductory chapter on general morphology of larvae and their special adaptations, with notes on collecting and preserving.

A section is then devoted to each of the various orders.

In addition to the illustrations in the text, there are 18 black and white plates and 4 coloured plates, depicting nearly 400 species.

An index of genera and higher groups, with references to the relevant text figures and plates, completes the volume.

NEW SPECIES OF *CLAYIA* (MALLOPHAGA: MENOPONIDAE) FROM THE FRENCH CAMEROONS.

By K. C. Emerson.

(*Fort Leavenworth, Kansas, U.S.A.*)

Two new species and one new subspecies of the genus *Clayia* are described from material collected by Dr. J. Mouchet, Chargé de Recherches de l'O.R.S.T.O.M., Yaounde, French Cameroons. The author is greatly indebted to Dr. Mouchet for the opportunity to study this material and to Dr. Theresa Clay, British Museum (Natural History), for her assistance and suggestions.

Clayia moucheti sp. n.

Material examined.—Eight males and nine females from *Phasidus niger* Cassin, collected at Ambam, French Cameroons.

Male.—General form and dorsal chaetotaxy as shown in fig. 1. Prosternal plate with four small setae, mesosternal plate with eight medium-length setae, and metasternal plate with twelve medium-length setae. Venter of third femur with distinct patch of setae. First abdominal sternite with six small setae. Abdominal sternites II–VI each with two rows of short setae medianly which expand into three indistinct rows near the lateral margins. Sternites IV–VI each with distinct patches of setae in the posterior lateral angles. Sternite VII with three rows of short setae. Sternite VIII with three rows of short setae, and separated from genital plate, which is void of setae except on posterior margin. Nine long setae posteriorly on each side of genital opening. Pleurites with four medium-length setae on posterior margins, and eight to ten short setae evenly spaced on remainder of surface. Male genitalia as shown in fig. 3.

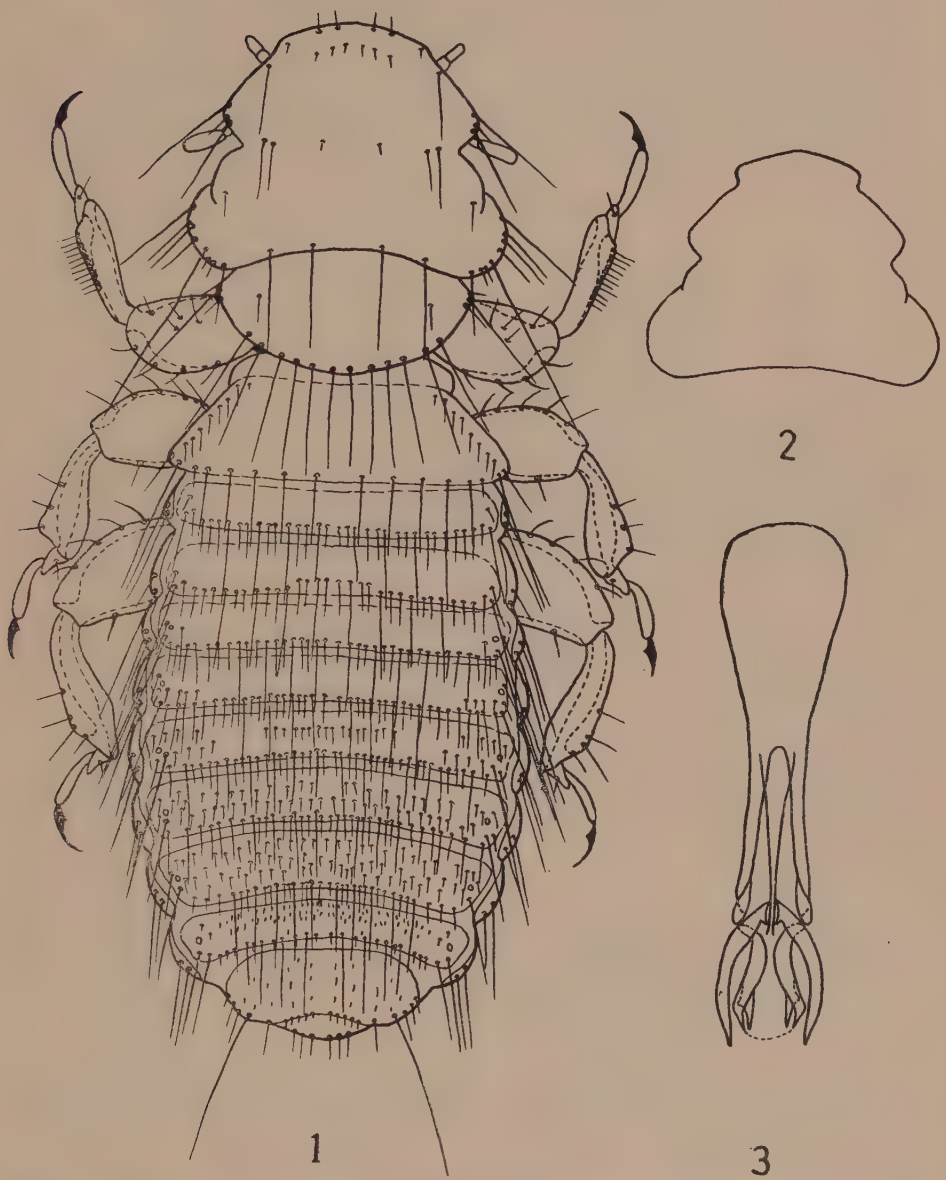
Female.—Shape of head as shown in fig. 2. Similar to male, except as noted. Chaetotaxy of abdominal tergites is slightly more dense, and the medium-length setae are heavier. Tergites VII and VIII are not distinctly separated. Four heavy medium-length setae on lateral margins of tergites VII–IX. Genital plate with ten to twelve short setae on each lateral margin, and eight to ten medium-length and eight to ten short setae on the posterior margin. Anal fringe with only short setae.

Measurements in millimetres.

	Male.	Female.
Length of head . .	0·34	0·43
Width of head . .	0·50	0·55
Width of prothorax .	0·41	0·50
Width of metathorax .	0·54	0·73
Width of abdomen . .	0·63	0·87
Total length . . .	1·56	1·95

This species is closest to *C. chapini* Emerson. It differs from that species and all other known forms as follows: (1) more robust in general form, (2) shape of head in female, and (3) male genitalia. Parameres of the male genitalia are especially unusual, as may be seen by comparing figs. 3 and 6.

Holotype male and allotype female are in the British Museum (Natural History), type slide number 630.



FIGS. 1–3.—*Clayia moucheti* sp. n. (1) Dorsal view of male. (2) Outline of head of female. (3) Male genitalia.

Clayia squamata sp. n.

Material examined.—Eight males and three females from *Francolinus squamatus squamatus* Cassin, collected at Yaounde, French Cameroons.

Male.—As illustrated in fig. 4. Male genitalia as illustrated in fig. 6.

Female.—Shape of head as shown in fig. 5. Dorsal chaetotaxy same as in male. Ventral chaetotaxy, except for terminal abdominal segments, similar to male. Sternite VIII with three medium-length setae on each lateral margin, and six medium-length setae on posterior margin. Sternite IX bare except for eighteen medium-length setae in anal fringe.

Measurements in millimetres.

	Male.	Female.
Length of head	0·32	0·33
Width of head	0·41	0·41
Width of prothorax	0·35	0·36
Width of metathorax	0·47	0·47
Width of abdomen	0·58	0·58
Total length	1·76	1·88

This species is related to *C. spinosa* (Piaget) and *C. distincta* Emerson. In addition to differences in size and male genitalia, the new form has fewer dorsal abdominal setae than either of the above mentioned species.

Holotype male and allotype female in the British Museum (Natural History), type slide number 631.

Clayia mjöbergi plumifera subsp. n.

Material examined.—Five males and seven females from *Guttera plumifera plumifera* (Cassin), collected at Yaounde, French Cameroons.

The male genitalia appear to be the same as those of the nominate form. The subspecies differs in both sexes in being larger and possessing fewer dorsal setae on the abdomen. Tergites I–III with only a few setae on the lateral margins or posterior lateral angles rather than two or three distinct rows of setae, as in *C. mjöbergi mjöbergi* (Cummings).

Measurements in millimetres.

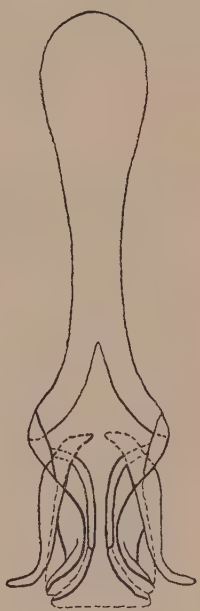
	Male.	Female.
Length of head	0·45	0·50
Width of head	0·58	0·64
Width of prothorax	0·45	0·52
Width of metathorax	0·58	0·71
Width of abdomen	0·68	0·95
Total length	2·35	2·85

Holotype male and allotype female in the British Museum (Natural History), type slide number 632.

Clayia sp. (1)

Material examined.—Two males and one female from *Guttera plumifera plumifera* (Cassin), collected at Ambam, French Cameroons.

Except for measurements, this form agrees quite well with the description of *C. cruzi* (Tendeiro). The specimens at hand are smaller in all respects than the measurements given by Tendeiro for *C. cruzi*.



FIGS. 4–6.—*Clayia squamata* sp. n. (4) Dorsal-ventral view of male. (5) Outline of head of female. (6) Male genitalia.

Measurements in millimetres.

	Male.	Female
Length of head . .	0·28	0·29
Width of head . .	0·33	0·36
Width of prothorax .	0·30	0·34
Width of metathorax .	0·37	0·43
Width of abdomen . .	0·44	0·54
Total length . . .	1·34	1·56

Clayia sp. (2)

Material examined.—One male and one immature female from *Guttera plumifera plumifera* (Cassin), collected at Ambam, French Cameroons.

Except for being considerably smaller, this form agrees quite well with the description of *C. wernecki* (Tendeiro). The abdomen of the male at hand is narrower and more tapering than illustrated by Tendeiro for *C. wernecki*.

Measurements (*in millimetres*) of the male are: length of head, 0·28; width of head 0·28; width of prothorax, 0·28; width of metathorax, 0·41; width of abdomen, 0·46; and total length, 1·55.

Other Species in the Genus.

C. chapini Emerson, 1954, *Proc. ent. Soc. Wash.* **56**: 206, figs. 6 and 7. Type host: *Afropavo congensis* Chapin.

C. cruzi (Tendeiro), 1955, *Rev. Garcia de Orta* **3**: 137, figs. 3 and 4; pl. 3, figs. 5 and 6; and pl. 4, fig. 7. Type host: *Guttera edouardi edouardi* (Hartlaub).

C. distincta Emerson, 1954, *Proc. ent. Soc. Wash.* **56**: 206, figs. 8 and 9. Type host: *Francolinus levaillanti kikuyuensis* Ogilvie-Grant.

C. mjöbergi mjöbergi (Cummings), 1914, *Bull. ent. Res.* **5**: 163, figs. 4–6. Type host: *Guttera edouardi sethsmithi* Neumann.

C. spinosa (Piaget), 1880, *Les Pédiculines*: 537, pl. 44, fig. 9. Type host: *Francolinus capensis* (Gmelin).

C. subtheresae Emerson, 1954, *Proc. ent. Soc. Wash.* **56**: 204, figs. 4 and 5. Type host: *Acryllium vulturinum* (Hardwicke).

C. theresae Hopkins, 1941, *J. ent. Soc. S. Afr.* **4**: 46. Type host: *Numida meleagris major* Hartlaub.

C. wernecki (Tendeiro), 1954, *Bol. cult. Guiné Port.* **9**: 25, figs. 5 and 6. Type host: *Guttera edouardi pallasi* (Stone).

References.

Emerson, K. C., 1954, Three new African species of *Clayia* (Mallophaga: Menoponidae). *Proc. ent. Soc. Wash.* **56**: 203–207.

Tendeiro, J., 1954, Malófagos da Guiné Portuguesa. Estudos sobre diversos Malófagos dos Galiformes Guineense. *Bol. cult. Guiné Port.* **9**: 3–162.

——, 1955, Malófagos de Moçambique. Algumas espécies recolhidas em Galiformes. *Rev. Garcia de Orta* **3** (2): 131–164.

THE NOMENCLATURE OF *ACANTHOPSYCHE JUNODI* HEYLAERTS (LEPIDOPTERA : PSYCHIDAE).

By J. G. Betrem
(*Institute of Tropical Agriculture, Deventer, The Netherlands*)

AND

L. L. J. Ossowski.
(*Wattle Research Institute, University of Natal, Pietermaritzburg, South Africa.*)

The scientific name of the wattle bagworm, a native insect of South Africa and one of the most destructive insect pests in wattle plantations of that country, has undergone several changes since the first description of this psychid in 1890. Recent investigations, however, have shown that the present name, *Acanthopsyche junodi* Heyl., used for nearly 40 years, appears to be incorrect. The authors came to this conclusion after examining the original collection of bagworms of Junod determined by Heylaerts, which is in the Rijksmuseum van Natuurlijke Historie at Leiden, the collection of psychids in the British Museum, and over 100 adult males from different parts of the wattle growing area of South Africa.

The wattle bagworm was first described by Heylaerts (1890). The material was sent to him by Junod in larval and in pupal form from plantations near Howick, Natal, and reared by Heylaerts in Breda, the Netherlands. The males emerged during July, i.e. approximately at the same time as they emerge in South Africa. Heylaerts puts his new species *junodi* in the genus *Eumeta*[1] because the median vein in the cell of both wings has an upper and a lower branch, cutting off a special cell, the " cellule interposée " of Heylaerts. It appears, however, that *E. junodi*, as described by Heylaerts is not at all allied to the true *Eumeta* species, as defined by its type. Whereas in the true *Eumeta* both branches of the median vein end on the transverse nervure between the veins 6 and 4 + 5, in *junodi* only the upper branch ends between these veins and the lower branch ends between 4 + 5 and 3. Furthermore, the wings of *Eumeta* and of closely allied genera are densely scaled on their whole surface, while those of *junodi* are nearly hyaline and have very few scales. Lounsbury (1899) first mentioned this insect as one of economic importance in South Africa, and Fuller (1901) first referred to it as an *Animula* species of the family Psychidae and as of common occurrence in the native mimosas of South Africa. Later, however, Fuller (1913) gave the name of the bagworm as *Chalioides junodi* Heylaerts, stating that he was indebted to C. K. Brain for this determination, which was confirmed by G. K. (now Sir Guy) Marshall. Hardenberg (1917) mentioned that he did not know on what authority Fuller placed *junodi* in the genus *Chalioides* Swinhoe, 1892, and the present authors also have been unable to find the reason for this placing of the bagworm. It may be that it

[1] Heylaerts does not mention the genus *Eumeta* in his monograph on Psychidae (1881), though this genus was already published by Walker (1855). Heylaerts (1884), however, states that his genus *Lansdownia* is a synonym of *Eumeta*. His conception of this genus is thus identical with that of *Cryptothelea* of Strand (1929).

was done because of the hyaline wings of this insect. There are, however, so many differences between the genus *Chalioides* and the insect in question that it is impossible to leave it there. *Chalioides* has no spine on the fore tibiae, vein 6 or (7) of the fore wing is missing, and veins 7 and 8 of the hind wing are both present and are separated from each other, being only very loosely held together by a bar. Not all these characteristics are represented in the wattle bagworm. Fuller (1913) also shows on plate IX photographs bearing the caption "*Chalioides junodi*". These photographs depict, however, neither adult males of the wattle bagworm, nor a *Chalioides*, but a true *Eumeta* species. Janse (1917), most probably following Hampson (1893), placed *junodi* in the genus *Acanthopsyche*. Janse, in doing so, was quite correct at that time. If we use Hampson's (*loc. cit.*) key, we find that the genus *Acanthopsyche* has all the characteristics which *junodi* possesses. But Janse does not put *A. junodi* in any of the subgenera enumerated by Hampson, because *junodi* does not possess the characteristics of any of these subgenera. Janse (*loc. cit.*) also mentions that it is not quite clear why some of the groups of Heylaerts and Hampson of the Psychidae do not receive generic status. Some of them differ more from each other than do some genera in other families. Strand (1929) placed the bagworm in the genus *Cryptothelea*, considering *Eumeta* as a synonym of *Cryptothelea*. Heddergott (1953), following Strand, also lists the bagworm under that genus. He has stated, however (H. Heddergott, *private communication*), that he does not regard the given classification as binding, but thought it appropriate to follow this authority as long as there is no revision of the psychids. The genus *Cryptothelea* Duncan, 1841, was erected for *Oiceticus macleayi* Guilding, 1827, a West Indian species, and not an Australian one as stated by Walker (1855) and Strand (*loc. cit.*). It is allied to *Platoeceticus* Packard, 1869, (Jones, 1945). The majority of species listed by Strand (*loc. cit.*) under the heading *Cryptothelea* belong to the genera: *Eumeta* Walker, 1855; *Amatissa* Walker, 1862; and *Clania* Walker, 1855.[2] These genera are not synonyms of *Cryptothelea* according to their type species (compare Betrem, 1952). The conception of Strand (*loc. cit.*) and of Heddergott (*loc. cit.*) can, therefore, not be accepted. To do so would be to perpetuate some of the errors set right by Betrem (1952), who showed that the genotype of *Acanthopsyche* is the palaearctic species *Psyche opacella* H.S. which, according to Strand (*loc. cit.*), is a synonym of *Phalaena atra* Linn., 1776. This species is in no way allied to *E. junodi*, and furthermore, since the wattle bagworm is an indigenous insect of the Ethiopian Region, it cannot remain either in the palaearctic genus *Acanthopsyche*, or in the neotropical genus *Cryptothelea*. We have, therefore, to look for another genus and species closely related to *junodi*. For this purpose it is necessary to point out the main characteristics of this species, which are as follows:

(1) the fore tibiae bear a long process (*apophysis*);
(2) the lower branch of the median vein in the cell of the fore wing ends in the transverse nervure between the veins 3 and 4 + 5;
(3) the veins 7 and 8 of the hind wings are coalescent in their apical half;
(4) vein 6 is present in the fore and hind wings;
(5) the cell of the hind wing is long, therefore the free ends of the veins are short;
(6) the wings do not have scales, they are nearly hyaline.

[2] For Australian species *vide* Meyrick & Lower (1907).

Only two other species possessing most of these characteristics have been described, viz. *Oiceticus doubledaii*[3] Westw., 1854 (Westwood 1854) from Ceylon, and *Kotochalia shirakii*[3] Sonan, 1935 (Sonan 1935) from Formosa. They differ from *junodi* in the absence of the lower branch of the median vein in both wings. Moore (1877) erected for *O. doubledaii* the genus *Chalia* 1877, which however, is preoccupied by *Chalia* Walker, 1868. Betrem (*loc. cit.*) therefore re-named this

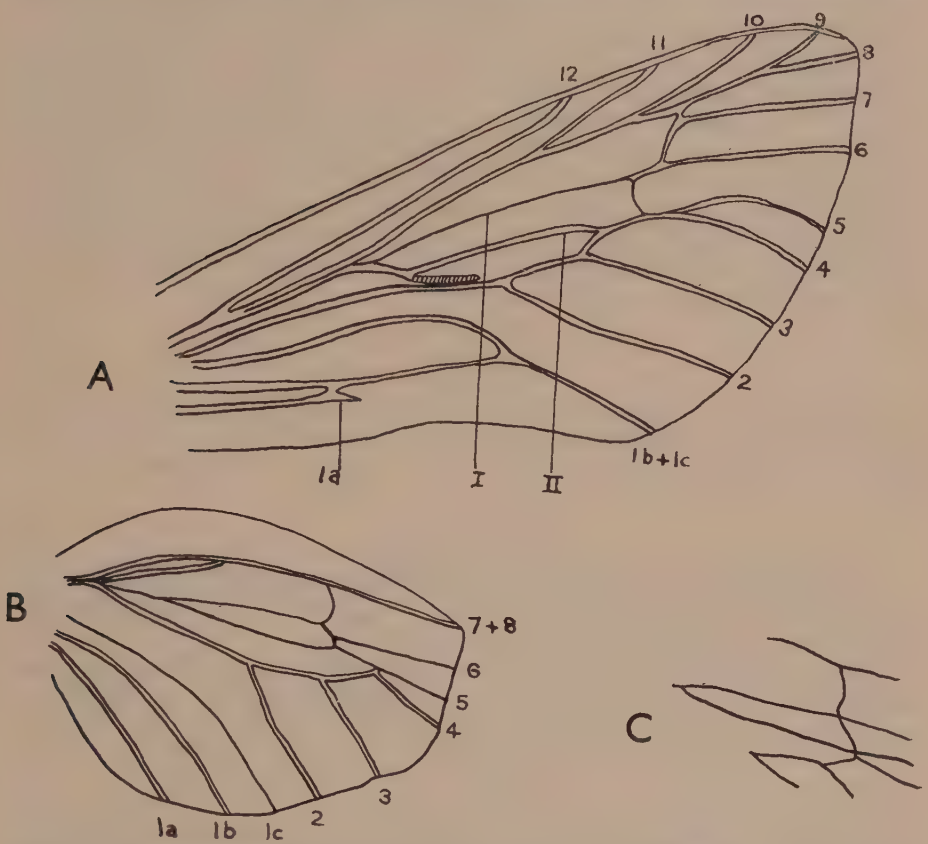


FIG. 1.—*Kotochalia junodi* Heylaerts. (A) Fore wing showing venation. (B) Hind wing. (C) Variation of venation of central part of hind wing. (1*a*, 1*b*, 1*c*, 2, etc., wing veins. Median vein: (I) upper branch, (II) lower branch.)

genus *Chaliella*. The fore wing of *Kotochalia* does not differ from that of *Chaliella*, and the hind wing differs only in the absence of vein 5 and this cannot be considered sufficient to distinguish two genera, but only two species within one genus. *Kotochalia* Sonan (1935), being older, must therefore be considered a synonym of *Chaliella* Betrem, 1952 (**syn. nov.**). *A. junodi*, however, differs sufficiently from the type species to have created for it a new subgenus, viz.

[3] *O. doubledaii* is not a synonym of *K. shirakii*. The former has antennae which are less than half the length of the fore margin of the fore wings, and a scutellum ornated with yellow hairs. The latter has antennae more than half the length of that margin, and a scutellum which bears hairs of the same colour as the rest of the body.

Chaliopsis subgen. n. This subgenus is characterised by the furcated vein in the median cell of the fore and hind wings. It differs constantly, also, in the free end of vein 1 *a* in the fore wing, which never reaches the inner margin. In the true *Kotochalia* species this stub is lacking. There are also some variations in the neuration of the wings. The most pronounced are the following deviations in the fore wing : vein 5 is often present only as a stub near the base of the veins 4 + 5. Fourteen specimens (out of 105 examined) did not have a stub at all. Vein 10 is sometimes incomplete (in 12 out of 105 examined) and in two cases it was visible only as a dark stripe. Vein 7 nearly always extends from the transverse vein at the end of the cell, somewhat beneath the stalk of 8 + 9. In two cases it extended from the stem of 8 + 9, but a stub was present in the original place. The venation of the hind wing also shows some variation, e.g. vein 6 has its origin mostly on the transverse vein ; sometimes, however, it is inserted at the end of the upper branch of the median vein. From these considerations it appears that *junodi* should be placed as follows : Family : Psychidae ; genus : *Kotochalia* ; subgenus : **Chaliopsis** subgen. n. ; Species : *Kotochalia junodi* (Heyl., 1890), **comb. nov.**

Summary.

The history of the naming and re-naming of the wattle bagworm, a psychid, is traced and an attempt is made to elucidate the reasons for the various changes. The necessity for giving this insect its proper generic status is stressed.

Acknowledgments.

The authors wish to thank the Directors of the Rijksmuseum van Natuurlijke Historie, Leiden, and the Trustees of the British Museum (Natural History) for permission to examine the collections of Psychidae.

Special thanks are due to Mr. W. H. T. Tams of the British Museum (Nat. Hist.) for help during the examination of the material and for a most generous gift of some rare papers on Psychidae.

References.

Betrem, J. G., 1952, The genotypes of the Indo-Australian Psychidae (Lep.). *Tijdschr. Ent.* **95** : 331–340.

Fuller, C., 1901, The wattle bagworm. *Rep. Gov. Ent. Natal Dep. Agric.* **1899–1900** : 51–54.

——, 1913, The wattle bagworm (*Chalioides junodi* Heylaerts). *Bull. S. Afr. Dep. Agric.* **28**.

Hampson, G. F., 1893, *The fauna of British India*, Moths. **1** : 293–299. London.

Hardenberg, G. B., 1917, South African bagworms : their transformation, life-history, and economic importance : Part I. *Ann. Natal Mus.* **3** : 619–686.

Heddergott, H., 1953, *In* Sorauer, *Hdb. d.Pflanzenkrankh.* **3** (I), 2 : 22. Berlin.

Heylaerts, F. J. M., 1881, Essai d'une monographie des psychides de la faune Européenne. *Ann. Soc. ent. Belg.* **25** : 28–73.

——, 1884 Observations synonymiques et autres relatives à des psychides avec descriptions de *novae species*. *C. R. Soc. ent. Belg.* **28** : 34–41.

——, 1890, Une psychide inédite de l'Afrique meridionale. *Eumeta junodi m. Ibid.* **34** : CXXX.

Janse, A. J. T., 1917, South African bagworms. Notes on the Psychidae and the genera *Gymnelema* and *Trichosoma*, with descriptions of five new species. *Ann. Natal Mus.* **3** : 589–614.

Jones, F. M., 1945, *Platoeceticus* and a remarkable new species of this genus (Lep. Psych.). *Trans. Amer. ent. Soc.* **71** : 99–124.

Lounsbury, C. P., 1899, The wattle bagworm. *Cape Agric. J.* **14** : 211–215.

Meyrick, E. and Lower, O. B., 1907, Revision of the Australian Psychidae. *Trans. roy. Soc. S. Aust.* **31** : 192–208.

Moore, F., 1877, Descriptions of Ceylon Lepidoptera. *Ann. Mag. nat. Hist.* (4) **20** : 345.

Sonan, J., 1935, Psychidae of Japan. *Trans. nat. Hist. Soc. Jap.* **25** : 448–455.

Strand, E., 1929, *In* Junk, W., *Lepidopterorum Catalogus*. Pars 34. K. W. v. Dalla Torre *et* E. Strand. *Psychidae* : 187. Berlin.

Walker, F., 1855, List of specimens of lepidopterous insects in the collection of the British Museum. **4** : 956.

Westwood, J. O., 1854, Descriptions of some species of lepidopterous insects belonging to the genus *Oiceticus*. *Proc. zool. Soc. Lond.* **22** : 219–243.

Book Notice.

The Armored scale insects of California. By Howard L. McKenzie. 8vo. Berkeley and Los Angeles (University of California Press). 1956. Pp. x + 209, text illust. [*Bulletin of the California Insect Survey*, Vol. 5.] Price $4.50.

This work deals specifically with all the scale insects belonging to the homopterous family Diaspididae, found in California.

Relevant taxonomic literature, chronologically arranged, type locality and host, other known hosts, and specific localities in various parts of California, with details of the collector and date, are given for each species. Wherever possible the present status of the species is discussed and its relationship to allied species indicated.

An index of species, genera and higher categories, a host index and finally a host list including the Diaspididae species arranged alphabetically by plant families are included.

A detailed drawing of each species is given and there are three coloured plates of scale insects shown actual size on the infected plants.

A NEW GENUS AND SPECIES OF DOLICHOPODIDAE (DIPTERA) FROM MALAYA.

By H. Oldroyd.

A recent collection of Diptera sent by Mr. H. T. Pagden to the Commonwealth Institute of Entomology included a pair of flies of the family Dolichopodidae, which were referred to me for naming. Both sexes are remarkable for the grotesque snout, composed, apparently, of the clypeus, labrum, palpi and labium, all drawn out, and closely applied to each other.

A search of the literature has failed to disclose any earlier name for this fly, which is hereby described as a representative of a new genus and species. Mr. Pagden has very kindly presented the specimens to the British Museum collection.

Thambemyia gen. n.

Head.—Occiput rounded, with a crown of occipital spines. Ocellar tubercle large, with two strong interocellar bristles, the tubercle sunk in a pit of the vertex, which extends round it like a collar. Because of this, the two strong vertical bristles appear from their position to be fronto-orbitals (see fig. 1, left). Eyes densely hairy, their true shape uncertain because of shrinking of the specimens. Antennae with narrow, bare first segment, not notched into second; third segment evenly tapered, carrot-shaped; arista apical, two-segmented. Face very narrow, and greatly drawn out into a stiff, keel-like ridge, which extends far below lower margin of eyes. This ridge forms part of a complex snout, which is apparently built up from the plate-like, hairy palpi, the labrum, and the labium and labella, all closely applied to each other, as shown in fig. 1, left. The dark areas seem to be partly hard, and partly membranous, but the exact relations of the parts cannot be seen without dissection.

Thorax.—Moderately arched, with well-developed chaetotaxy: acrostichals monoserial, irregularly biserial posteriorly; dorsocentrals strong, 2 + 4; several post-humerals and intra-alars; and a single humeral, notopleural, supra-alar and post-alar. Mesonotum flattened before scutellum which has 4–6 strong, erect marginal bristles. Pleura as in figure 1, with a few weak propleurals and mesopleurals only.

Abdomen.—First segment reduced to a small sclerite, surrounded by membrane, lying close against a ridge of metanotum. Consequently there are only six obvious pregenital segments in both sexes. Hypopygium of male twisted to the right, bringing the eighth sternite into view dorsally. Genitalia bulbous and sessile, with a pair of moderately big lamellae, simple in outline, and covered with hairs (fig. 1). Female also with six pregenital segments, and with a short ovipositor like that of some Asilids; the seventh and eighth segments laterally compressed (though not severely so), and partly bare and shining. Anal lamellae each with a short, stiff bristle.

Legs.—Slender, and relatively bare of large bristles, though covered with short ones. In the male the hind femora have rather longer bristles ventrally, and fore legs are modified: fore femora swollen basally, first tarsal segments flattened and notched (fig. 1), associated with a small apical comb on fore tibia. Female has none of these modifications, except the comb on the fore tibia.

Wings.—Venation as in figure 1, without any special features. Costa reaches to tip of vein M_1 (fourth vein).

Length. About 3·5 mm.

The general structure of this fly would seem to place it in the subfamily Rhaphiinae, perhaps most nearly related to *Epithalassius* Mik, but distinguished from that genus, as from all others known to me, by the head-structure.

Type species: *Thambemyia pagdeni* sp. n., by present designation.

Thambemyia pagdeni sp. n. (Fig. 1.)

Metallic green in ground colour, but heavily overlaid by ashy grey and blackish tomentum. All bristles of body black. Mesonotum of *thorax* blackish-brown between dorsocentrals, and in two patches on each side, otherwise ashy grey : tomentum of scutellum and of pleura ashy grey. Dorsum of *abdomen* without pattern, uniformly covered with ashy grey

Fig. 1.—*Thambemyia pagdeni* sp. n. (Right) Male seen from right side ; (Left) Head of male, right antenna omitted.

tomentum, through which the metallic green ground colour is clearly visible. Abdomen also uniformly covered with short, stiff, black bristles, the male abdomen rather more cylindrical than that of female, and its tomentum denser. Lamellae of male smooth in outline, without any of the long processes seen in some other Rhaphiinae. *Legs* of male ashy black-brown, only fore femora a little greenish, and trochanters, knees and basitarsi a little yellowish ; all covered with short, stiff, black bristles. Femora of female a little more yellowish-brown in ground colour. *Wings* of both sexes without pattern, slightly and uniformly smoky. Halteres yellow-brown.

Malaya : Penang, at light, 20.ii.1956 (*H. T. Pagden*). Type ♂, and 1 ♀ paratype, both deposited in the British Museum (Nat. Hist.).

A NEW GENUS OF PTILODACTYLIDAE (COLEOPTERA) FROM JAPAN.

By J. W. T. Armstrong
(*Callubri, Nyngan, N.S.W.*)

AND

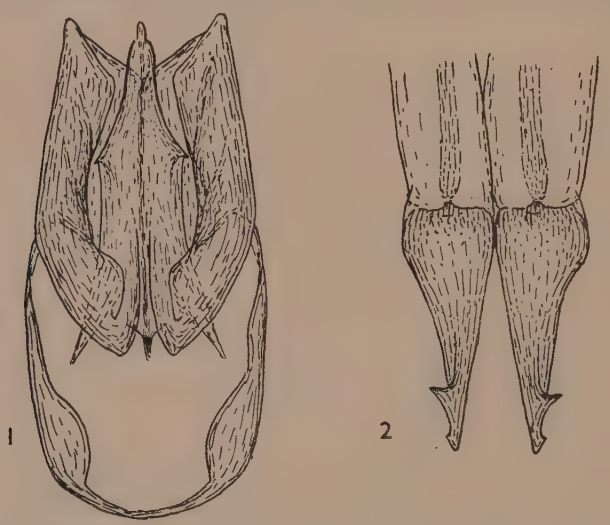
Takehiko Nakane.
(*Assistant Professor of Biology, Saikyo University, Tokyo*).

It has become necessary to erect a new genus, in the Ptilodactylidae, for *Epilichas niponicus* Lewis. The form of the tarsi alone, with the fourth segment very small and couched above the lamellate pad of the third (which is not the case in *Epilichas*), is sufficient to exclude it from White's genus, from which it differs also in many other respects.

Pseudoepilichas gen. n. (Figs. 1 and 2).

Elongate, nitid, facies of *Epilichas*.

Head strongly convex, obliquely carinate above insertion of antennae; *eyes* small, distant, placed well forward; *labrum* small, prominent, transverse, convex, subtruncate; *mandibles* much exposed, short, strongly curved, sharply and strongly bidentate at apex;



Figs. 1–2.—*Pseudoepilichas niponicus* (Lewis): Genitalia. (1) Male. (2) Female.

maxillary palpi with terminal segment subsecuriform; *labial palpi* with terminal segment securiform; *antennae* pectinate in male (rami broadly based), subserrate in female. *Pronotum* rounded apically, produced above and concealing head, basal denticulation obsolete, sides sharply margined and narrowly explanate for basal half, margin incomplete. *Scutellum* not notched or denticulate at base. *Elytra* with sutural striae deeply impressed. *Prosternum* moderately short and horizontal before coxae, process narrow.

Coxae all separated, fore and middle prominent ; *legs* moderate ; *tarsi* with first segment longer than the following three together, second and third produced in a lamellate pad beneath, fourth very small and concealed from below by third, fifth longer than first.

Genitalia : Male (fig. 1) with lateral lobe short and broad, with apex broadly and somewhat obliquely truncate ; female barbed (fig. 2).

Type species *Pseudoepilichas niponicus* (Lewis) **comb. nov.** = *Epilichas niponicus* Lewis.

This genus is much more nearly related to *Claditoma* Westwood, 1837, than to *Epilichas*, but that genus has the prothorax completely margined at the sides and the hind coxae contiguous.

References.

Lewis, G., 1895, *Ann. Mag. nat. Hist.* (6) **14** : 101.

Nakane, T., 1948, *Bull. Takarazuka Insectarium* **45** : 10. Figs. 5*d*, 6*d*, 9*a* and 11. (In Japanese.)

Book Notices

Insect pests of farm, garden, and orchard. By L. M. Peairs and R. H. Davidson. 5th ed. 8vo. New York (John Wiley & Sons, Inc.), London (Chapman & Hall). 1956. Pp. ix + 661, 577 text-figs. Price 68*s*.

This is the fifth edition of a work which first appeared in 1912, with later editions in 1921, 1931 and 1941.

Most of the text has now been rewritten to bring it into line with the revolutionary changes which have occurred during the past decade, and the present edition includes information on over 60 new pest species, with data on their destructive effects and distribution.

The first seven chapters deal with the essentials of insect morphology, physiology and development, insect classification, and with the principles and practices of control, both biological and chemical.

A new chapter contains information on insecticide formulations, application equipment, dilution tables and other relevant data.

In the following chapters (Chapters 8–23) the pests are dealt with in detail under the fruits, cereals, vegetables, plants or stored products which they infest.

Evolution and classification of the Mountain Caddisflies. By Herbert H. Ross. 4to. Urbana (University of Illinois Press). 1956. Pp. vi+ 213, 45 charts, 370 text-figs. Price $6.00.

In this work the author has brought together in a biogeographic study the results of his extensive research on the Caddisflies.

The introductory chapter explains the terminology employed and certain general concepts which form the basis of the main study.

The evolution of Caddisflies is dealt with in Chapter 2. Each of the following three chapters deals with the evolution and dispersal of the three most primitive families, Philopotamidae, Rhyacophilidae and Glossomatidae, including in each case a systematic account correlating the taxonomic data on which the evolutionary conclusions are based.

Common dispersal characteristics are discussed in Chapter 6, and dispersal in geological time in Chapter 7.

Chapter 8 comprises the author's summary and conclusions. A very comprehensive bibliography and an index complete the work.

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